

Operations on the real numbers



From the school book

- Remember
- Understand
- O Apply Roblem Solving

Interactive test

1 Find each of the following in the simplest form:

- $1\sqrt{3} + 2\sqrt{3}$
- $35\sqrt[3]{7} 8\sqrt[3]{7} + 2\sqrt[3]{7}$

- $212\sqrt{5} 3\sqrt{5} + \sqrt{5}$
- $4\sqrt{5} 2\sqrt{5} + 5\sqrt{5} \sqrt{5}$

2 Find each of the following in the simplest form:

- $\sqrt{5} \sqrt{3} + 2\sqrt{5} + \sqrt{3}$

- $2\sqrt{3} + 5 + \sqrt{3} 6$
- $2\sqrt{7} 3\sqrt{2} + \sqrt{7} + 5\sqrt{7}$ $4 2\sqrt{2} 3\sqrt[3]{2} + 5\sqrt{2} + \sqrt[3]{2}$

3 Find the result of each of the following:

- $1\sqrt{3} \times \sqrt{3}$
- $2 2\sqrt{5} \times 3\sqrt{5}$
- $\frac{1}{3}\sqrt{3}\times\sqrt{3}$ $\boxed{5}\left(\sqrt[3]{5}\right)^3\times3\sqrt{3}$
- $32 \times 3\sqrt{2}$
- **6** $2\sqrt{3} \times \frac{2\sqrt{7}}{7} \div \frac{20\sqrt{3}}{5\sqrt{7}}$

4 Find the result of each of the following in the simplest form:

- $12(\sqrt{2}+\sqrt{5})$
- $2 \square \sqrt{2} \left(5 + \sqrt{2}\right)$
- $\boxed{3} \boxed{\sqrt{7} (\sqrt{7} + 2)}$

- 4 \square $-\sqrt{3}\left(-5-\sqrt{3}\right)$ 5 $-2\sqrt{5}\left(3-\sqrt{5}\right)$ 6 $\sqrt{7}\left(\frac{2}{\sqrt{7}}-\sqrt{7}+3\right)$
- $7 3(8 + 2\sqrt{3}) + 6\sqrt{3}$ 8 $1 \sqrt{5}(3 \sqrt{5}) 2(1 + \sqrt{5})$

5 Find the result of each of the following operations:

$$\boxed{1} \bigcirc (\sqrt{2} + 1) (\sqrt{2} - 1) \qquad \boxed{2} (4 - 3\sqrt{2}) (4 + 3\sqrt{2}) \qquad \boxed{3} (\sqrt{5} - 1)^2$$

$$(\sqrt{5}-1)^2$$

$$(2\sqrt{3}+4)^2$$

5
$$\square$$
 $(\sqrt{3}+2)(\sqrt{3}-1)$ **6** $(5-\sqrt{3})^2-28$

$$(5-\sqrt{3})^2-28$$

6 Make the denominator in each of the following an integer:

$$\boxed{1} \frac{3}{\sqrt{3}}$$

$$\frac{10}{\sqrt{5}}$$

$$\boxed{3} \boxed{\square} - \frac{6}{\sqrt{3}}$$

$$\frac{4}{\sqrt{6}}$$

$$\frac{2}{3\sqrt{2}}$$

$$\frac{6}{2\sqrt{3}}$$

$$\frac{7}{2\sqrt{10}} \frac{25}{2\sqrt{10}}$$

$$\frac{\sqrt{2}+3}{\sqrt{2}}$$

$$\frac{\sqrt{5}-15}{2\sqrt{5}}$$

7 Choose the correct answer from those given:

$$1\sqrt{7} + \sqrt{7} = \dots$$

(c)
$$2\sqrt{7}$$

$$(d)\sqrt{14}$$

$$\sqrt{3} + \left(-\sqrt{3}\right) = \cdots$$

(a)
$$2\sqrt{3}$$

(a)
$$2\sqrt{3}$$
 (b) $2\sqrt{6}$

$$2\sqrt{3} + 3\sqrt{3} = \dots$$

(a)
$$5\sqrt{6}$$
 (b) $5\sqrt{3}$

(b)
$$5\sqrt{3}$$

(c)
$$6\sqrt{3}$$

(d)
$$5\sqrt[3]{3}$$

$$9 \quad 4 \quad \Box \quad 5 + 7\sqrt{2} - 4 + \sqrt{2} = \cdots$$

(b)
$$1 + 7\sqrt{2}$$

(a) 15 (b)
$$1 + 7\sqrt{2}$$
 (c) $1 + 8\sqrt{2}$

(d)
$$1 + 6\sqrt{2}$$

$$5 \square - 2\sqrt{3} \times \sqrt{3} = \cdots$$

$$(a) - 6$$

(a)
$$-6$$
 (b) $-2\sqrt{3}$

(c)
$$2\sqrt{3}$$

$$(2\sqrt[3]{5})^3 = \cdots$$

(c)
$$4\sqrt[3]{5}$$

(a)
$$-2\sqrt{3}$$

(b)
$$2\sqrt{3}$$

(c)
$$-3\sqrt{2}$$

(d)
$$3\sqrt{2}$$

The additive inverse of the number $(\sqrt{2} - \sqrt{5})$ is

(a)
$$\sqrt{2} + \sqrt{5}$$

(b)
$$\sqrt{5} - \sqrt{2}$$

$$(c)\sqrt{2}-\sqrt{5}$$

(a)
$$\sqrt{2} + \sqrt{5}$$
 (b) $\sqrt{5} - \sqrt{2}$ (c) $\sqrt{2} - \sqrt{5}$ (d) $-\sqrt{2} - \sqrt{5}$

- The multiplicative inverse of the number $\sqrt{5}$ is
 - (a) 5
- (b) $\frac{-1}{5}$
- (c) $\frac{5}{\sqrt{5}}$
- (d) $\frac{\sqrt{5}}{5}$
- The multiplicative inverse of the number $\frac{\sqrt{2}}{6}$ is
 - (a) $\sqrt{3}$
- (b) $3\sqrt{2}$
- (c)√6
- (d) $\frac{\sqrt{2}}{2}$

- $\boxed{11}\left(\sqrt{5} + 3\sqrt{5}\right) \div \sqrt{5} = \cdots$
 - (a) $3\sqrt{5}$
- (b) 3
- (c) 5
- (d) 4
- 12 If $x = \sqrt{2} + 10$, $y = \sqrt{2} 10$, then $(x + y)^2 = \dots$
 - (a) 4
- (b) 6
- (c) 8
- (d) $4\sqrt{2}$

8 Complete the following:

- The multiplicative neutral in \mathbb{R} is and the additive neutral in \mathbb{R} is
- \square The additive inverse of the number $1 \sqrt{2}$ is
- The multiplicative inverse of the number $\frac{2\sqrt{3}}{5}$ is $\frac{6}{6}$
- The multiplicative inverse of the number $\frac{3}{\sqrt{3}}$ is $\frac{1}{\sqrt{3}}$
- $9 = 5 = 7 + \sqrt{3} = 5 + (\cdots + \cdots)$
- If $a = \frac{\sqrt{2}}{\sqrt{3}}$, $b = \frac{\sqrt{3}}{\sqrt{2}}$, then $\frac{a}{b} = \dots$
- $\sqrt{3} 2^2 = 7 \dots$
- $\blacksquare \text{ If } \sqrt{x} = \sqrt{2+1} \text{ , then } x = \dots$
- If $x^2 = (2\sqrt{3} \sqrt{7})(2\sqrt{3} + \sqrt{7})$, then $x = \dots$
 - o If $x^2 y^2 = 16$, $x y = \sqrt{2}$, then $x + y = \dots$
 - of side length of a square is ℓ cm. and its area is 15 cm², then the area of the square of side length 2 ℓ cm. is
 - If $a \in \mathbb{R}$ and $b \in \mathbb{R}$, then a b means the sum of the number a and of the number b
 - If $a \in \mathbb{N}$, $b \in \mathbb{Q}$ and $c \in \mathbb{R}$, then $a + b + c \in \dots$

- If $x = \sqrt{5} 2$ and $y = \sqrt{5} + 2$, find the value of each of the following:
 - 1 X + y

 $|4| x^2 - v^2$

- $\begin{bmatrix} 2x y \\ 5x^2 + 2xy + y^2 \\ \end{bmatrix}$ $\begin{bmatrix} 3xy \\ 6x^2 2xy + y^2 \\ \end{bmatrix}$
- If $x = \sqrt[3]{2\sqrt{2}}$, find the value of : $(x + \sqrt{2})^2$

«8»

- If $\frac{a}{2\sqrt{2}+2} = \frac{b}{2\sqrt{2}-2} = 1$ Prove that : $a \times b = a b$
- If $x = \sqrt{15} + 2$ and $y = 4 \sqrt[3]{25}$, estimate the value of each of the following:
 - 1 X, y

- $2 \times y$
- $3 \chi + y$

Check the reasonability of each value using your calculator.

Geometric Application

A rectangle is of dimensions $(6+\sqrt{5})$ cm. and $(6-\sqrt{5})$ cm.

Calculate its perimeter and its area.

« 24 cm. • 31 cm² »

For excellent pupils

14 If $a - b = 2\sqrt{3}$, find the value of: $a (a - b)^3 + b (b - a)^3$

« 144 »

If the multiplicative inverse of the number $\sqrt{a} - 1$ is $\frac{\sqrt{a+1}}{4}$, find the numerical value of a

16 If x = 2 y = 4 z = $\sqrt{2}$, find the value of: $x^2 + 2$ y $x^2 + 4$ z x^2

 $(3\frac{1}{2})$

If the number y is the additive inverse of X and $\frac{1}{2}$ (y – X) = 1 – $\sqrt{2}$

Prove that: $xy - 2\sqrt{2} = -3$

Wonders

of numbers

- 11×1=1
- ¥11 × 11 = 121
- ¥ 111 × 111 = 12321
- ≥ 1111 × 1111 = 1234321

What happens when you multiply 11111 × 11111?



Operations on the square roots





From the school book









1 Put each of the following in the form a \sqrt{b} where a and b are two integers, b is the least possible value:

1
$$\sqrt{12}$$

$$\frac{2}{5}\sqrt{1000}$$

$$5 2 \sqrt{\frac{1}{2}}$$

6
$$6\sqrt{\frac{2}{3}}$$

Simplify each of the following to the simplest form :

$$1 \sqrt{50} + \sqrt{8}$$

$$< 7\sqrt{2} > 2$$
 2 $\sqrt{20} - \sqrt{45}$

$$3\sqrt{2} + \sqrt{8} - \sqrt{18}$$

$$<2\sqrt{2}>$$
 $\sqrt{98}-\sqrt{128}-\sqrt{18}+4\sqrt{2}$

$$\boxed{5} \ \square \ 2\sqrt{18} + \sqrt{50} + \frac{1}{3}\sqrt{162} \quad \text{``14}\sqrt{2} \text{``} \qquad \boxed{6} \ \sqrt{98} + \sqrt{50} - \frac{1}{2}\sqrt{200} - \sqrt{2} \qquad \text{``6}\sqrt{2} \text{``}$$

6
$$\sqrt{98} + \sqrt{50} - \frac{1}{2}\sqrt{200} - \sqrt{2}$$

7
$$11\sqrt{27} + 5\sqrt{18} - \sqrt{300}$$
 « $15\sqrt{2} - 7\sqrt{3}$ »

3 Put each of the following in the simplest form:

$$2\sqrt{32}-\sqrt{72}+6\sqrt{\frac{1}{2}}$$

3 1
$$2\sqrt{5} + 6\sqrt{\frac{1}{3}} - \sqrt{12} - 5\sqrt{\frac{1}{5}}$$
 $\sqrt{5}$ $\sqrt{5}$ $\sqrt{3} + \frac{3}{\sqrt{3}} - \sqrt{2} \times \sqrt{6}$

$$\frac{4}{\sqrt{3}} + \frac{3}{\sqrt{3}} - \sqrt{2} \times \sqrt{6}$$

$$\sqrt{18} - \frac{\sqrt{12}}{\sqrt{6}}$$

$$\ll 2\sqrt{2} \gg$$

$$\sqrt{(-5)^2} + \sqrt{18} - \frac{6}{\sqrt{2}}$$



4 Simplify each of the following to the simplest form:

$$12\sqrt{3}\times5\sqrt{2}$$

$$< 10\sqrt{6} >$$
 $2\sqrt{18} \times 3\sqrt{2}$

$$3 \square \sqrt{5} \times 2\sqrt{10}$$

$$\ll 10\sqrt{2} \times \sqrt{\frac{2}{7}} \times \sqrt{\frac{7}{2}}$$

$$\frac{3\sqrt{15}}{\sqrt{5}}$$

$$\langle 3\sqrt{3} \rangle$$
 $= 12\sqrt{\frac{2}{3}} \times \sqrt{54}$

5 Simplify each of the following to the simplest form:

$$1\sqrt{6}(\sqrt{3}-\sqrt{2})$$

$$25\sqrt{2}(2\sqrt{2}+\sqrt{12})$$

$$3\sqrt{5}-\sqrt{7}$$
 $(3\sqrt{5}+\sqrt{7})$

$$4\left(\sqrt{3}-\sqrt{2}\right)^2$$

$$(\sqrt{3} + \sqrt{5})^2 - \sqrt{60}$$

$$\sqrt{18} - \frac{12}{\sqrt{6}} + \sqrt{2} \left(2\sqrt{3} - 3 \right)$$

6 Write each of the following such that the denominator is an integer:

$$\frac{1}{\sqrt{2}}$$

$$2\sqrt{\frac{5}{3}}$$

$$\frac{5\sqrt{3}}{\sqrt{5}}$$

$$\frac{4\sqrt{3}-\sqrt{2}}{2\sqrt{3}}$$

7 Choose the correct answer from those given:

$$\frac{\sqrt{63}}{\sqrt{7}} = \dots$$

$$(b)\sqrt{3}$$

$$(d) \pm 3$$

$$\sqrt{8}$$
 $\sqrt{8}$ $\sqrt{2}$ =

$$(a)\sqrt{6} \qquad \qquad (b)\sqrt{2}$$

(a)
$$\sqrt{10}$$

(d)
$$\sqrt{18}$$

$$\boxed{4} \square \left(\sqrt{7} - \sqrt{5}\right) \left(\sqrt{7} + \sqrt{5}\right) = \cdots$$

(c)
$$2\sqrt{7}$$

(d)
$$-2\sqrt{5}$$

$$5\sqrt{5} + \sqrt{5} = \cdots$$

(a)
$$\sqrt{10}$$
 (b) $\sqrt{20}$

(b)
$$\sqrt{20}$$

$$\sqrt{\frac{1}{2}} + \sqrt{\frac{1}{2}} = \cdots$$

(b)
$$\sqrt{\frac{1}{4}}$$

(d)
$$\frac{\sqrt{2}}{2}$$

$$\frac{\sqrt{27}}{\sqrt{3}} \div \frac{\sqrt{72}}{\sqrt{2}} = \dots$$

- (a) $\frac{1}{2}$ (b) 2
- (c) 2
- (d) 4
- The multiplicative inverse of the number $\sqrt{50}$ is

 - (a) $\frac{\sqrt{2}}{10}$ (b) $\frac{-\sqrt{2}}{10}$ (c) $-5\sqrt{2}$

If
$$X = \frac{\sqrt{6}}{\sqrt{2}}$$
, then $X^{-1} = \dots$

- (a) $\sqrt{3}$ (b) $\frac{\sqrt{3}}{2}$ (c) $\frac{\sqrt{3}}{2}$
- (d) $2\sqrt{3}$

o If
$$X = \sqrt{7} + \sqrt{3}$$
 and $y = \sqrt{28} + \sqrt{12}$, then $X = \dots$

- (a) y
- (b) $\frac{1}{2}$ y
- (c) 2 y (d) y^2

8 Complete the following:

$$\frac{3\sqrt{2}}{2\sqrt{18}} = \cdots$$

$$2\sqrt{3} \times \sqrt{6} = 3 \times \cdots$$

$$\boxed{3} \ \frac{1}{2} \sqrt{48} = 2 \times \cdots$$

$$\sqrt{3 \times \sqrt{6}} = 3 \times \dots$$

$$\sqrt{3 \cdot \frac{3}{8}} = \frac{3}{2} \sqrt{\dots}$$

5 If
$$2\sqrt{27} - 2\sqrt{48} = x\sqrt{3}$$
, then $x = \dots$

$$6 \quad \boxed{1} \sqrt{5}, \sqrt{20}, \sqrt{45}, \sqrt{80}, \dots$$
 (in the same pattern).

If
$$x^2 = \frac{8}{9}$$
, then x in the simplest form =

If
$$x^2 = 5$$
, then $(x + \sqrt{5})^2 = \cdots$ or \cdots

\bigcirc Find the value of each of X + y, $X \times y$ in each of the following cases:

1
$$x = 3 + \sqrt{5}$$
, $y = 1 - \sqrt{5}$

$$x = \sqrt{3} - \sqrt{2}$$
, $y = \sqrt{3} + \sqrt{2}$

$$3 x = 5 - 3\sqrt{2}$$
, $y = 5 - 3\sqrt{2}$

$$\times 10 - 6\sqrt{2} \cdot 43 - 30\sqrt{2} \times$$

If
$$X = \frac{\sqrt{2}}{\sqrt{3}}$$
 and $y = \frac{\sqrt{3}}{\sqrt{2}}$, find the value of : 6 (X + y)

If
$$x = \frac{10}{\sqrt{5}}$$
, $y = \sqrt{45} + \sqrt{2}$ and $z = \sqrt{8} + \sqrt{5}$

• find in the simplest form the value of the expression
$$(x - y + z)^2$$



12 If
$$x = 2\sqrt{5} + \sqrt{2}$$
, $y = 2\sqrt{5} - \sqrt{2}$

, find the value of the expression :
$$x^2 + 2 x y + y^2$$

« 80 »

13 If
$$x = \sqrt{7} + \frac{1}{2}\sqrt{12}$$
 and $y = \frac{1}{3}\sqrt{63} - \sqrt{3}$, prove that : $x^2y^2 = 16$

For excellent pupils

If
$$a^x = 6$$
 and $a^{-y} = \sqrt{3}$, find the value of: a^{x+y}

«2√3»

15 Simplify each of the following to the simplest form:

$$\frac{\left(\sqrt{5}\right)^3 \times \left(\sqrt{5}\right)^5}{\left(\sqrt{10}\right)^6}$$



The two conjugate numbers



From the school book

Remember

Understand

Write the conjugate number of each of the following numbers :

$$1\sqrt{5} + \sqrt{3}$$

$$25-2\sqrt{7}$$

$$3 \sqrt{5} + \frac{2}{\sqrt{2}}$$

2 Make the denominator of each of the following a rational number:

$$\frac{1}{\sqrt{7}-\sqrt{2}}$$

$$\frac{\sqrt{3}}{2-\sqrt{3}}$$

$$\frac{\sqrt{7}+3}{\sqrt{7}-3}$$

3 If
$$x = \frac{2}{\sqrt{7} - \sqrt{5}}$$
 and $y = \sqrt{7} - \sqrt{5}$, find the value of : $(x + y)^2$

If
$$x = \frac{4}{\sqrt{7} - \sqrt{3}}$$
 and $y = \frac{4}{\sqrt{7} + \sqrt{3}}$, find the value of : $x^2 y^2$

5 If
$$x = \sqrt{5} + \sqrt{3}$$
, prove that : $\frac{4}{x} + 2x = 4\sqrt{5}$

If
$$a = \sqrt{3} + \sqrt{2}$$
 and $b = \frac{1}{\sqrt{3} + \sqrt{2}}$, find the value of : $a^2 - b^2$ in its simplest form. « $4\sqrt{6}$ »

7 If
$$x = \sqrt{5} - \sqrt{3}$$
 and $y = \frac{2}{\sqrt{5} - \sqrt{3}}$, find the value of : $x^2 + 2xy + y^2$ « 20 »

If
$$x = \sqrt{5} - \sqrt{2}$$
 and $y = \frac{3}{\sqrt{5} - \sqrt{2}}$, prove that x and y are conjugate numbers, then

find the value of :
$$x^2 - 2xy + y^2$$



If $x = 3 + \sqrt{5}$ and $y = \frac{4}{3 + \sqrt{5}}$, prove that x and y are conjugate numbers, then find:

$$2x^2 + y^2$$

If
$$X = \frac{2}{\sqrt{5} - \sqrt{3}}$$
 and $y = \frac{2}{\sqrt{5} + \sqrt{3}}$, find the value of : $x^2 - xy + y^2$ « 14 »

If
$$x = \sqrt{5} + \sqrt{2}$$
 and $y = \sqrt{5} - \sqrt{2}$, find the value of: $\frac{x + y}{xy - 1}$ in its simplest form. $\sqrt{5}$

If
$$a = \frac{4}{\sqrt{7} - \sqrt{3}}$$
 and $b = \frac{4}{\sqrt{7} + \sqrt{3}}$, find the value of : $\frac{a - b}{a b}$

13 If
$$x = 2\sqrt{2} - \sqrt{3}$$
 and $y = \frac{5}{\sqrt{8} - \sqrt{3}}$

, prove that
$$X$$
 and y are conjugate numbers and calculate : $\frac{X+y}{Xy}$

$$\frac{4\sqrt{2}}{5}$$
 »

If
$$x = \frac{5\sqrt{2} + 3\sqrt{5}}{\sqrt{5}}$$
 and $y = \frac{2\sqrt{5} - 3\sqrt{2}}{\sqrt{2}}$

, find the value of each of : 1
$$\chi^2$$
 + y^2

, then prove that :
$$\chi^2 + y^2 = 38 \chi y$$

If
$$X = \frac{1}{2 + \sqrt{3}}$$
 and $y = \frac{12}{\sqrt{3}}$, find the value of : $X^2 + y$

If
$$X = \frac{1}{\sqrt{3} - \sqrt{2}}$$
 and y is the multiplicative inverse of X

, find y, then prove that :
$$(x + y)^2 = 12$$

If
$$x = \sqrt{13} + \sqrt{6}$$
, $xy = 1$, find the value of : $x^2 - 49y^2$

If
$$X = \frac{4}{\sqrt{7} - \sqrt{3}}$$
 and $y^{-1} = \frac{1}{\sqrt{7} - \sqrt{3}}$

(Remember that
$$y^{-1} = \frac{1}{y}$$
)

, prove that X and y are conjugate numbers , then find the value of :
$$\chi^2$$
 y 2

If
$$x = \sqrt{7} + \sqrt{5}$$
 and $y = \frac{2}{x}$, find the value of : $\frac{x + y}{xy}$ in its simplest form.

20 If
$$x = \frac{\sqrt{6} + \sqrt{5}}{\sqrt{6} - \sqrt{5}}$$
, prove that : $x + \frac{1}{x} = 22$

21 Complete the following:

$$\boxed{ \left(\sqrt{7} + \sqrt{3} \right) \left(\sqrt{7} - \sqrt{3} \right) = \cdots }$$

If
$$x = 3 + \sqrt{2}$$
, then its conjugate is and the product of multiplying x by its conjugate is

The conjugate number of the number
$$\frac{2}{\sqrt{5}-\sqrt{3}}$$
 is

The conjugate number of the number
$$1 + \frac{7}{\sqrt{7}}$$
 in the simplest form is

5 The multiplicative inverse for
$$(\sqrt{3} + \sqrt{2})$$
 in its simplest form is

If
$$X = 2 + \sqrt{5}$$
 and y is the conjugate number of X, then $(X - y)^2 = \cdots$

If
$$\frac{x}{5-\sqrt{5}} = 5+\sqrt{5}$$
, then the value of x in its simplest form is

If
$$\frac{1}{x} = \sqrt{5} - 2$$
, then the value of X in its simplest form is

5 If
$$X = \sqrt{3} + 2$$
, $y = \sqrt{3} - 2$, then $(Xy, X + y) = \cdots$

$$10 \left(\sqrt{2} + \sqrt{3}\right)^{-9} \left(\sqrt{2} - \sqrt{3}\right)^{-9} = \dots$$

22 In each of the following, if a and b are two integers, find the value of each of them:

$$\frac{11}{2\sqrt{5}+3} = a\sqrt{5} + b$$

$$\frac{3}{2\sqrt{2}-\sqrt{5}} = a\sqrt{2} + b\sqrt{5}$$

$$\frac{7}{\sqrt{8}+1} = a + b\sqrt{2}$$

 $\alpha = 1 + 2n$

23 Simplify each of the following:

$$\boxed{1} \frac{4}{\sqrt{5} + \sqrt{3}} + \frac{4}{\sqrt{5} - \sqrt{3}}$$

«4√5»

$$\frac{\sqrt{6} - \sqrt{5}}{\sqrt{6} + \sqrt{5}} - \frac{\sqrt{6} + \sqrt{5}}{\sqrt{6} - \sqrt{5}}$$

$$\boxed{3} \sqrt{75} - \sqrt[3]{125} + \frac{10}{\sqrt{3} - 1}$$

« 10√3 »

For excellent pupils



24 If $x = \sqrt{4 + \sqrt{7}}$, $y = \sqrt{4 - \sqrt{7}}$, find in the simplest form : $(x + y)^2$

« 14 »

If
$$x = \sqrt{5} + 1$$
 and $y = \sqrt{5} - 1$, find the value of : $x y^{-1} + y x^{-1}$

If
$$\frac{x}{y} = \sqrt{3} - \sqrt{2}$$
, find the value of $\frac{3x^2 + 3y^2}{xy}$

«6√3»

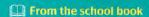
27 If
$$x = \sqrt{7} + \sqrt{6}$$
 and $y = \sqrt{7} - \sqrt{6}$, find the value of : $\frac{x^8 y^9 - y}{(x + y)^5}$

« zero »



Operations on the cube roots





Remember

Understand

Apply

Rroblem Solving



11 Put each of the following in the form $a\sqrt[3]{b}$ where a and b are two integers, b is the least possible positive value:

$$1\sqrt[3]{16}$$

$$\frac{2}{3}\sqrt[3]{-135}$$

$$\sqrt[3]{-54}$$

$$\frac{5}{3} \sqrt[3]{\frac{1}{3}}$$

$$32\sqrt[3]{250}$$

$$6-10\sqrt[3]{\frac{2}{5}}$$

2 Find the result of each of the following in its simplest form:

$$1\sqrt[3]{2} \times \sqrt[3]{32}$$

$$\frac{1}{2}\sqrt[3]{10} \times 6\sqrt[3]{100}$$

$$\frac{\sqrt[3]{72}}{\sqrt[3]{9}}$$

$$\frac{4\sqrt[3]{-54}}{2\sqrt[3]{-2}}$$

3 Find the result of each of the following in its simplest form :

$$\frac{1}{\sqrt{16}} \sqrt[3]{2}$$

$$\sqrt[3]{2}$$
 »

$$\sqrt[8]{\frac{3}{2}}$$
 × $\sqrt[8]{\frac{3}{125}} - \sqrt[3]{24}$

$$(5-2\sqrt[3]{3})$$

$$\sqrt[3]{81} + \sqrt[3]{-24}$$

$$\sqrt[3]{3}$$
 $\sqrt[3]{54} + \sqrt[3]{16} - \sqrt[3]{250}$

$$\boxed{5} \ 2\sqrt[3]{54} - 5\sqrt[3]{2} + \sqrt[3]{16}$$

$$\frac{3}{\sqrt{16}} + \frac{3}{\sqrt{10}} \times \sqrt[3]{25}$$

$$\ll 7\sqrt[3]{2}$$
 »

$$7\sqrt[3]{16} + \sqrt[3]{10} \times \sqrt[3]{25}$$
 $\sqrt[3]{2}$ $\sqrt[3]{24} - 6\sqrt[3]{13} \frac{8}{9}$

$$\ll -8\sqrt[3]{3} \approx$$

4 Drove that :

$$1 \sqrt[3]{128} + \sqrt[3]{16} - 2\sqrt[3]{54} = zero$$

$$\sqrt[3]{54} \times \sqrt[3]{16} \div \left(\sqrt[3]{4} \times 6\right) = 1$$

5 Simplify each of the following to the simplest form:

$$\sqrt[3]{81} + \sqrt[3]{-24} - 3\sqrt[3]{\frac{1}{9}}$$

$$\boxed{1} \sqrt[3]{81} + \sqrt[3]{-24} - 3\sqrt[3]{\frac{1}{9}} \qquad \text{« zero »} \qquad \boxed{2} \sqrt[3]{54} + 8\sqrt[3]{-\frac{1}{4}} + 5\sqrt[3]{16} \qquad \text{« } 9\sqrt[3]{2} \text{»}$$

$$(4.9)^{3}\sqrt{2}$$
 »

$$3\sqrt[3]{108} - 2\sqrt[3]{4} - \sqrt[3]{\frac{1}{2}}$$

$$(\frac{1}{2})^{3}\sqrt{4}$$
 »

« zero »

6 Simplify each of the following to its simplest form :

$$\frac{7}{3}\sqrt{18} + \sqrt[3]{54} - 7\sqrt{2} + \sqrt[3]{16}$$

$$\ll 5\sqrt[3]{2}$$
 »

$$2\sqrt{27} + \frac{1}{3}\sqrt[3]{27} - 9\sqrt{\frac{1}{3}} - 1$$

$$\sqrt[3]{\sqrt{-16}} + \frac{14}{\sqrt{7}} - \sqrt{28} + \sqrt[3]{54}$$

$$\sqrt{18} + \sqrt[3]{54} - \frac{\sqrt{216}}{\sqrt{12}} - \sqrt[3]{16}$$

$$\sqrt[3]{2}$$
 w

5
$$5\sqrt{2} - \frac{1}{2}\sqrt{200} + (\sqrt[3]{5} \times \sqrt[3]{25})$$

45 »

Simplify the following to its simplest form:

$$2\sqrt[3]{16}\left(3\sqrt[3]{4}+5\sqrt[3]{32}-2\sqrt[3]{\frac{1}{2}}\right)$$

« 96 »

B Choose the correct answer from those given:

$$\sqrt{1}$$
 $\sqrt{3}\sqrt{54} + \sqrt[3]{-2} = \cdots$

(a)
$$\sqrt[3]{52}$$

$$(b)^{3}\sqrt{2}$$

(c)
$$2\sqrt[3]{2}$$

(d)
$$4\sqrt[3]{2}$$

$$\sqrt[2]{164} + \sqrt{16} = \cdots$$

$$(c) - 8$$

$$(d) \pm 8$$

$$\frac{\sqrt[3]{\frac{16}{3\sqrt{2}}}}{\sqrt[3]{2}} = \cdots$$

$$(b) - 2$$

(d)
$$2\sqrt[3]{2}$$

$$\sqrt[3]{2} + \sqrt[3]{2} = \cdots$$

$$(a)^{3}\sqrt{2}$$

(a)
$$\sqrt[3]{2}$$
 (b) $\sqrt[3]{4}$

$$(c)^{3}\sqrt{8}$$

$$(d)^{3}\sqrt{16}$$

$$\sqrt[3]{\frac{2}{9}} = \cdots$$

(a)
$$\frac{\sqrt[3]{6}}{3}$$

(b)
$$\sqrt[3]{\frac{1}{6}}$$

$$(c)^{3}\sqrt{6}$$

$$(d)^{3}\sqrt{2}$$

Complete the following:

$$\sqrt[3]{\frac{2}{3}} \times \sqrt[3]{-12} = \cdots$$

If
$$x = 2$$
, $y = \sqrt[3]{-16}$, then $\left(\frac{x}{y}\right)^3 = \dots$

$$\sqrt[3]{3} \times \sqrt[3]{9} = \sqrt{\cdots}$$

$$\frac{1}{2}\sqrt[3]{56} - \sqrt[3]{\frac{7}{27}} = \dots$$

$$\boxed{\mathbf{B}} \frac{\sqrt[3]{250} - \sqrt[3]{16}}{\sqrt[3]{54}} = \dots$$

If $a = \sqrt[3]{5} + 1$, $b = \sqrt[3]{5} - 1$, find the value of each of the following:

$$(a-b)^5$$

$$(a+b)^3$$

If
$$x = 3 + \sqrt[3]{6}$$
, $y = 3 - \sqrt[3]{6}$, find the value of $\left(\frac{x - y}{x + y}\right)^3$

$$\ll \frac{2}{9} \gg$$

12 Find the result of the following in its simplest form:

$$\sqrt[3]{32} + 4\sqrt[3]{\frac{1}{2}} - (2\sqrt[3]{-2})^2 + (\sqrt{2})^{\text{zero}} - (\frac{2}{\sqrt{2}})^2$$

«-1»

For excellent pupils

13 If
$$x = \sqrt[3]{2} + 1$$
, $y = \sqrt[3]{2} - 1$, prove that : $x^2 + y^2 = 2\sqrt[3]{4} + 2$

Make the denominator of
$$\frac{2}{\sqrt[3]{2}}$$
 a rational number.



Applications on the real numbers



Prom the school book

Remember

Understand

O Apply

- Problem Solving



The cube

- Complete the following:
 - 1 If the edge length of a cube is 5 cm., then its volume = \cdots cm³.
 - The edge length of a cube is 4 cm., then its total area = \cdots cm².
 - The lateral area of a cube whose edge length is ℓ cm. is cm².
 - The cube whose volume is ℓ^3 cm³, its total area = cm².
 - **5** The cube whose edge length is $2 \ell \text{ cm.}$, then its volume = cm³.
- 2 A cube whose lateral area is 36 cm². Find:
 - 1 Its total area.

2 Its volume.

« 54 cm² , 27 cm³ »

- The perimeter of one face of a cube is 12 cm. Find:
 - 1 Its volume.

2 Its lateral area.

- « 27 cm³ , 36 cm² »
- The sum of lengths of all edges of a cube is 60 cm. Find:
 - 1 Its volume.

2 Its total area.

« 125 cm³ , 150 cm² »

- 5 Choose the correct answer from those given :
 - 1 The volume of a cube is 1 cm^3 , then the sum of its edge lengths = cm.
 - (a) 1
- (b) 6
- (c) 8
- (d) 12

	Remember	 Understand 	O Whalla	Problem Solv	/ing	
2 The volu	me of a cube is 64 cm ³ .	, then its latera	al area = ····	cm ²		
(a) 4	(b) 8	(c) 64	((d) 96		
3 A cube of vol	ume 27 cm.3, then its t	otal area = ·····	cm ²			
(a) 9	(b) 27	(c) 36	(d) 54		
4 If the total are	ea of a cube is 96 cm ² ,	then the area	of one face	= cm ²		
(a) 16	(b) 64	(c) 24		(d) 48		
5 A cube of tota	al area 150 cm. ² , then i	ts lateral area :	= cm	2.		
(a) 25		(c) 125	(
6 If the area of	the six faces of a cube :	$= 54 \text{ cm}^2$, the	n its volum	e = cm ²	}	
(a) 54	(b) 44		(
7 If the volume	of a cube = 64 cm^3 , then	the length of a	diagonal of	one face = ·····	···· cm.	
(a) 16		(c) 32		d) 64	3 2037	
volume = ·····						
(a) 10	(b) 20	(c) 30		d) 40		
	length of a cube whose	volume is 21	2 cm ³ is	em.		
(a) $\sqrt{2}$	(b) 2	(c) 8	(d) 1.5		
The cuboic						
The dimensions of	f the base of a cuboid are	9 cm. and 10 c	em. and its h	neight is 5 cm. l	Find:	
1 Its volume.	2 Its lateral area	. 3 It	s total area.			
			« 4 <u>.</u>	50 cm ³ + 190 cm ³	370 cm ²	
The dimensions of	of a cuboid are $\sqrt{2}$ cm.	$\sqrt{3}$ cm. and $\sqrt{3}$	6 cm. Find	l its volume.	« 6 cm ³	
The dimensions of	of the base of a cuboid a	$\sqrt{3}$ cm. and	$(\sqrt{3}-1)$	cm. and its hei	ght equals	
$(3+\sqrt{3})$ cm. Ca	lculate its volume.				« 6 cm ³	
The lateral area o	f a cuboid is 480 cm ² a	nd its base is in	n the shape	of a square w	hose side	
length is 10 cm. (Calculate its height.				« 12 cm.	
Find the total	area of a cuboid whose	volume is 720	0 cm ³ and i	ts height is 5 c	em.	
with a squared-sh	ape base.				« 528 cm ²	

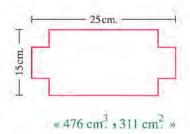


📶 📖 Which is more in size :

A cube whose total area is 294 cm² or a cuboid with dimensions $7\sqrt{2}$ cm., $5\sqrt{2}$ cm. and 5 cm. ?

12 In the opposite figure :

A rectangular piece of cardboard has a length of 25 cm. and a width of 15 cm. A square whose side length = 4 cm. was cut from each of its four corners, then the projected parts were folded to form a basin in the shape of a cuboid. Find the volume and the total area of that cuboid.



Consider $\pi = \frac{22}{7}$ if there are not any other values given. The circle

13 A circle is of radius length 10.5 cm. Find each of its circumference and its area.

« 66 cm. » 346.5 cm² »

The area of a circle is 154 cm². Find its circumference and its diameter length.

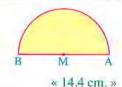
« 44 cm. > 14 cm. »

15 \square A circle whose area is 64 π cm². Find the length of its radius, then find its circumference approximating it to the nearest integer. ($\pi = 3.14$)

« 8 cm. , 50 cm. »

16 🛄 In the opposite figure :

 \overline{AB} is a diameter of the semicircle. If the area of this region is 12.32 cm².



, find the perimeter of the figure.

17 📖 In the opposite figure :

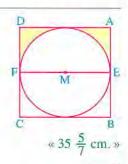
These are two concentric circles at M and their radii lengths are 3 cm. and 5 cm. Find the area of the shaded part in terms of π



« 16 π cm² »

18 🛄 In the opposite figure :

The circle M is inside the square ABCD If the area of the shaded part = $10\frac{5}{7}$ cm², find the perimeter of this part.

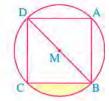


19 In the opposite figure :

The square ABCD is inside the circle M

If the radius length of the circle M is 7 cm.,

find the area of the shaded part and its perimeter.



 $(14 \text{ cm}^2)(11 + 7\sqrt{2}) \text{ cm.}$

The right circular cylinder Consider $\pi = \frac{22}{7}$ if there are not any other values given.

- 20 A right circular cylinder, the radius length of its base is 14 cm, and its height is 20 cm. « 12320 cm³ , 2992 cm² » Find the volume and the total area of the cylinder.
- 21 Find the lateral area for a right circular cylinder of volume 924 cm³ and of a height 6 cm.

« 264 cm² »

22 Find the total area of a right circular cylinder of volume 7536 cm³. and its height is 24 cm. ($\pi = 3.14$)

« 2135.2 cm² »

23 Which is more in volume:

A right circular cylinder with base radius length 7 cm and its height = 10 cm. or a cube whose edge length is equal to 11 cm.?

24 Complete the following:

- A right circular cylinder whose base radius length is r cm. and its height = h cm. , then its lateral area = \cdots cm² and its volume = \cdots cm³.
- 2 A right circular cylinder with volume 40π cm³ and its height = 10 cm. then its base radius length =
- A right circular cylinder with volume 500 π cm³ and its base radius length = 5 cm. then its height =
- A right circular cylinder with volume π r³ cm³, then its height =
- If the lateral area of a right circular cylinder is $2 \pi r^2 \text{ cm}^2$, then its height =
- The circumference of the base of a right circular cylinder is 44 cm, and its height = 25 cm. Find its volume. « 3850 cm³. »



- The lateral area of a right circular cylinder is 52 cm² and the length of the diameter of its « 104 cm³ » base is 8 cm. Find its volume.
- A right circular cylinder of volume 36 π cm³ and height 4 cm., the radius length of its base equals the edge length of a cube.

Find: The total area of the cube.

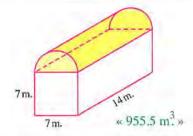
« 54 cm² »

28 III Find the height of a right circular cylinder whose height is equal to its base radius $\approx 2\sqrt[3]{9}$ cm. » length and its volume is $72 \, \pi \, \text{cm}^3$.

29 In the opposite figure :

A cuboid-shaped water tank with dimensions 7 m.

, 7 m. and 14 m. and the upper part of it is in the form of half of a right circular cylinder. Calculate the volume of the tank in m³.



- \square A piece of paper has a shape of a rectangle ABCD in which AB = 10 cm. and BC = 44 cm. It was folded to form a right circular cylinder such that AB is coincident to DC « 1540 cm³ » Find the volume of the resulted cylinder.
 - The sphere Consider $\pi = \frac{22}{7}$ if there are not any other values given.
- 31 [II] Find the volume and the surface area of a sphere if the length of its diameter is 4.2 cm.

« 38.808 cm³ » 55.44 cm² »

The volume of a sphere is 4188 cm³. Find its radius length. ($\pi = 3.141$)

33 \square The volume of a sphere is 562.5 π cm³. Find its surface area in terms of π

« 225 Д cm² »

- 34 Choose the correct answer from those given:
 - The volume of the sphere =

- (a) $4 \pi r^2$ (b) $\frac{4}{3} \pi r^3$ (c) $\frac{3}{4} \pi r^3$ (d) $\frac{4}{3} \pi r^2$ The sphere whose radius length is $\sqrt[3]{3}$ cm., its volume = cm³.
 - (a) 4 TT
- (b) $4\sqrt{3}\pi$ (c) $\frac{4}{3}\pi$ (d) $\frac{9}{4}\pi$
- The volume of the sphere whose diameter length is 6 cm. equals cm.
 - (a) 288
- (b) 12 π
- (c) 36 TT
- (d) 288 T

- If the volume of a sphere = $\frac{9}{16} \pi \text{ cm}^3$, then its radius length = cm.
 - (a) 3
- (b) $\frac{4}{3}$
- (c) $\frac{3}{4}$
- (d) $\frac{1}{3}$
- **5** If the surface area of a sphere is 9 π cm², then its diameter length = cm.
 - (a) 9
- (b) 3
- (c) 1.5
- (d) 6
- If three quarters of the volume of a sphere equals 8π cm³, then the length of its radius equals cm.
 - (a) 64
- (b) 8
- (c) 4
- (d) 2
- If the radius length of a sphere is r cm., then which of the following represents the ratio between the area of the sphere and its volume?
 - (a) $\frac{4}{r}$
- (b) $\frac{3}{r}$
- (c) $\frac{r}{4}$
- (d) $\frac{r}{\pi}$
- Find the radius length of a sphere if its volume equals the volume of a right circular cylinder whose height is 18 cm. and its base radius length is 4 cm. «6 cm.»
- Find the volume of a sphere if its radius length equals the radius length of a right circular cylinder with volume 7536 cm³ and height 24 cm. ($\pi = 3.14$)
- A lead cuboid is of dimensions 77 cm., 24 cm. and 21 cm. It was melted to make a sphere. Find the radius length of that sphere.
- A metallic sphere, with diameter length 6 cm. has got melt and changed into a right circular cylinder with base radius length 3 cm. Find its height.
- A sphere with volume 36π cm³ is placed inside a cube. If the sphere touches the six faces of the cube, find:
 - 1 The radius length of the sphere.
 - The volume of the cube.

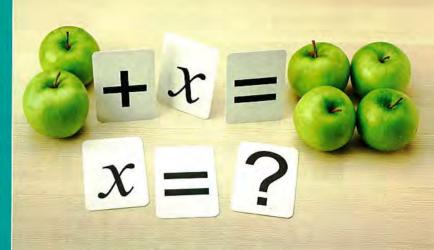
- « 3 cm. , 216 cm³, »
- A metallic sphere is of radius length 16.8 cm. It is melted and it is converted to 8 small spheres which are equal in volume. Find the radius length of each small sphere. « 8.4 cm. »
- A right circular cylinder has a height of 20 cm. Find its base radius length if its volume equals $\frac{4}{9}$ of the volume of a sphere with a diameter length of 30 cm. « 10 cm. »

For excellent pupils

- A cuboid has a square-shaped base whose height = 3 cm. If the sum of lengths of its edges is 52 cm., find its volume.
- A hollow metal sphere is with internal radius length 2.1 cm. and external radius length 3.5 cm. Find its mass approximated to the nearest gram taking into consideration that the mass of a cubic centimetre of such a metal is 20 gm. «2817 gm.»



Solving equations and inequalities of the first degree in one variable in \mathbb{R}



From the school book

Understand

Apply

Problem Solving



f 1 Find the solution set for each of the following equations in ${\mathbb R}\,$, then represent the solution on the number line:

1
$$\mathcal{X} + 5 = 0$$

$$2 \square 5 X + 6 = 1$$

3
$$2x + 4 = 3$$

$$2x-3=4$$

$$54 \times -1 = |-2|$$

$$\sqrt{5} x - 1 = 4$$

$$7x - 1 = \sqrt{3}$$

$$|\mathbf{8}| 2 - \sqrt{6} |\mathbf{x}| = |-8|$$

9
$$\triangle x + 2\sqrt{3} = 3$$

2 Choose the correct answer from those given:

1 The figure -3represents the solution set of the inequality in R

(a)
$$X > -3$$

(a)
$$X > -3$$
 (b) $X \ge -3$ (c) $X < -3$

(c)
$$X < -3$$

(d)
$$\chi \leq -3$$

represents the solution set of the 2 The figure ← o −6 inequality in R

(a)
$$-6 < X < 6$$
 (b) $-6 \le X < 6$ (c) $-6 < X \le 6$

$$(b) - 6 \le \mathcal{X} < 6$$

$$(c) - 6 < x \le 6$$

$$(d) - 6 \le x \le 6$$

 $3 \text{ If } x \in]3, \infty[$, then

(a)
$$X < 3$$

(b)
$$X \le 3$$

(b)
$$X \le 3$$
 (c) $X > 3$

(d)
$$X \ge 3$$

• 4 The S.S. of the inequality : x > 7 in \mathbb{R} is

(a)
$$]-7,\infty[$$

(a)
$$]$$
 - 7 , ∞ [(b) $[$ 7 , ∞ [(c) $]$ - ∞ , 7 [(d) $]$ 7 , ∞ [

(d)
$$]7,\infty[$$

o The S.S. of the inequality : $-1 < x \le 5$ in \mathbb{R} is

(a)
$$]-1,5]$$

(a)
$$]-1,5]$$
 (b) $[-1,5]$ (c) $\{-1,5\}$ (d) $[-1,5[$

(d)
$$[-1, 5[$$

The S.S. of the inequality: -x > 3 in \mathbb{R} is

(a)
$$\{-3\}$$

(c)
$$]-\infty$$
, 3

(b)
$$]3, \infty[$$
 (c) $]-\infty, 3[$ (d) $]-\infty, -3[$

3 Find the solution set for each of the following inequalities in \mathbb{R} in the form of an interval, then represent the solution on the number line:

$$|2| - 7 \times \ge -14$$

$$3 \times +3 \leq 5$$

$$|4| |1| 5 - x > 3$$

$$5 \square 2 x + 5 \ge 3$$

$$6 1 - 5 x < 6$$

7
$$\square$$
 $\frac{1}{2} X + 1 \le 2$ 8 \square $3 - 2 X \le 7$

B
$$3 - 2 \times 57$$

4 Find the solution set for each of the following inequalities in \mathbb{R} in the form of an interval, then represent the solution on the number line:

$$| 1 | 3 < x + 2 \le 6$$

$$2 - 5 < x + 3 < 9$$

$$3 \mid \square - 3 \le - x < 3$$

$$|4| |1| < 5 - x \le 3$$

6
$$\square$$
 5 < 3 - $x \le 3^2$

$$0 \le \frac{-2x+6}{2} < 4$$

$$\boxed{7}$$
 - 8 ≤ 3 X + 1 ≤ 4 $\boxed{8}$ $\boxed{1}$ | -3 | < 2 X - 1 < 5 $\boxed{9}$ - 3 < $\frac{1}{2}$ X - 2 ≤ zero

5 Find the solution set for each of the following inequalities in $\mathbb R$ in the form of an interval, then represent the solution on the number line:

$$\frac{1}{3} \times 2 \times 4$$

$$27 X - 9 \ge 4 X$$

$$3 \bigcirc 5 \times -3 < 2 \times +9$$

$$\boxed{4} \ 7 \ X - 12 \ge 5 \ X - 8$$

$$5 \mid x-1 \leq 3-x$$

6
$$1 - X ≥ -2 X - 3$$

6 Find the solution set for each of the following inequalities in \mathbb{R} in the form of an interval, then represent the solution on the number line:

$$1 \times 3 \ge 2 \times 2 \times 2 = 2$$

$$2 - X < X < 4 - X$$

$$3 \quad 4 \quad X \le 5 \quad X + 2 < 4 \quad X + 3$$

$$4 \square X - 1 < 3 X - 1 \le X + 1$$

$$\boxed{5} \ 2 + 2 \ X \le 3 \ X + 3 < 5 + 2 \ X$$

$$\frac{3 \times -4}{6} < \times +1 < \frac{\times +3}{2}$$

7 Complete the following:

If
$$X-3 \ge 0$$
, then $X = 0$

If 5
$$x < 15$$
, then $x = x$

3 If
$$1-x>4$$
, then x

If
$$-2 \times \leq 3$$
, then $\times \cdots$



- 5 \coprod If $\sqrt{2} X \le 4$, then X = 1
- **6** The S.S. of the inequality: $4 < 2 \times 8$ in \mathbb{R} is
- 7 The S.S. of the inequality: $-5 \le -x < 2$ in \mathbb{R} is
- **B** The S.S. of the inequality: 2 x < 0 in \mathbb{R} is
- $\boxed{ \textbf{9} } \text{ If } -3 < X < 3 \text{ where } X \subset \mathbb{R} \text{ , then } 2 X \subset \boxed{-6 \text{ , } \dots }$
- 8 Choose the correct answer from those given:
 - 1 The S.S. of the inequality : x + 3 < 3 in \mathbb{R} is
 - (a) $]-\infty$, 0[(b) $]-\infty$, 0[(c) $[0,\infty[$
- [d)]0,∞[
- Proof The S.S. of the inequality: 1 > x 5 > -1 in \mathbb{R} is
- (a) [4,6] (b)]4,6[(c)]4,6[
- (d) [4,6[

- 3 If X > 5, then -X......
- (a) < -9
- (b) ≥ -5 (c) < -5
- (d) > -5
- 4 If -2 < x < 2, then 2x + 3 belongs to

- (a) [-1,7] (b)]-1,5[(c)]-1,7[(d)]-4,6[
- 5 The number 5 belongs to the S.S. of the inequality
 - (a) X > 5
- (b) X < 5
- $(c) x \ge -5 \qquad (d) x \ge 5$

Life Application

9 A lift for carrying goods can carry 2200 kg. as a maximum weight. If we have 60 boxes of cans and the weight of one box is 45 kg., what is the maximum number of boxes can the lift carry in one time without carrying any person? « 48 boxes »

For excellent pupils

- Prove that $\sqrt{3}$ belongs to the S.S. of the inequality: $0 < 4 2 \times 6$ in \mathbb{R}
- If [4,7] is the S.S. of the inequality: $a \le x 3 \le b$, find the value of each of a and $b \le 1,4$
- If [m, m+n] is the S.S. of the inequality : $\frac{1}{5} \le \frac{2x+1}{5} \le 1$, find the value of n
- If $5 \le \frac{2x}{3} + 1 \le 7$, find the smallest value of the expression : x 2«4»
- Find in \mathbb{R} the S.S. of the inequality: $\frac{x}{\sqrt{3}-\sqrt{5}} \ge \sqrt{3}+\sqrt{5}$



The isosceles triangle

From the school book





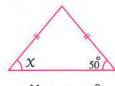


Rroblem Solving



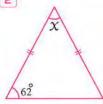
1 In each of the following, find the value of the symbol used for the measure of the angle:





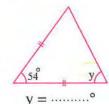
x = ······°

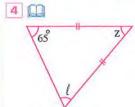
2



X = ······°

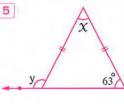






8



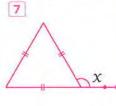


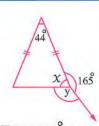
 $\chi = \cdots \circ$





$$\chi = \dots \circ$$





$$\chi = \dots \circ$$
, $v = \dots \circ$

2 Complete the following:

- 1 The base angles of the isosceles triangle are
- 2 The measure of each angle in the equilateral triangle equals°
- 3 In \triangle DEF, if DE = DF, then m (\angle E) = m (\angle )
- 4 In the isosceles triangle, if the measure of one of the two base angles is 65°, then the measure of its vertex angle equals°

- In the isosceles triangle, if the measure of the vertex angle equals 40°, then the measure of one of the two base angles equals°
- An isosceles triangle, the measure of its vertex angle is 80° , if the measure of one of its base angles is $(x + 30^{\circ})$, then $x = \dots$

3 Choose the correct answer from those given :

- In $\triangle XYZ$, if XY = YZ = XZ, then m ($\angle X$) =
 - (a) 30°
- (b) 60°
- (c) 90°
- (d) 180°
- The measure of the exterior angle of the equilateral triangle equals
 - (a) 60°
- (b) 90°
- (c) 120°
- (d) 180°
- $\stackrel{\bullet}{\circ}$ 3 LMN is a triangle in which LM = MN, m (\angle M) = 70°, m (\angle N) =
 - (a) 20°
- (b) 35°
- (c) 55°
- (d) 70°
- In \triangle ABC, AB = AC, m (\angle C) = 65°, then m (\angle A) =
 - (a) 30°
- (b) 50°
- (c) 55°
- (d) 130°
- o In \triangle XYZ, ZY = ZX, m (\angle Z) = 120°, then m (\angle X) =
 - (a) 30°
- (b) 60°

- (c) 90°
- (d) 120°
- $olimits_{\bullet}$ If Δ ABC is right-angled at A and AB = AC , then m (∠ B) =
 - (a) 30°
- (b) 45°
- (c) 60°
- (d) 90°
- \bullet 7 XYZ is an isosceles triangle in which, m (\angle Y) = 100°, then m (\angle Z) =
 - (a) 100°
- (b) 80°
- (c) 50°
- (d) 40°
- If the measure of one of the two base angles in the isosceles triangle is 30°, then the triangle is
 - (a) obtuse-angled.

(b) acute-angled.

(c) right-angled.

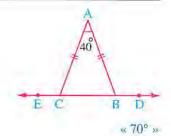
- (d) equilateral.
- In \triangle ABC, AB = AC, m (\angle B) = 6 X° , m (\angle A) = 3 X° , then $X = \dots$
 - (a) 30°
- (b) 12°
- (c) 60°
- (d) 90°
- In \triangle XYZ, if XY = XZ, then the exterior angle at the vertex Z is
 - (a) acute.
- (b) obtuse.
- (c) right.
- (d) reflex.

4 📺 In the opposite figure :

ABC is an isosceles triangle in which AB = AC,

 $m (\angle A) = 40^{\circ} \text{ and } D \in \overrightarrow{CB}, E \in \overrightarrow{BC}$

- **Tind:** m (∠ ABC)
- Prove that : $\angle ABD \equiv \angle ACE$

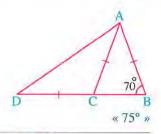


5 In the opposite figure :

$$AB = AC = CD$$

and m (
$$\angle$$
 B) = 70°

Find by proof: $m (\angle BAD)$

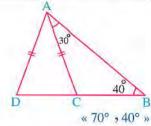


6 In the opposite figure:

m (
$$\angle$$
 B) = 40°, m (\angle BAC) = 30°

and
$$AC = AD$$

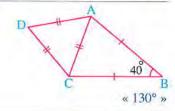
Find by proof:



In the opposite figure :

$$AD = DC = AC \cdot AB = BC$$

and m (
$$\angle$$
 ABC) = 40°

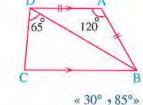


B In the opposite figure :

$$AB = AD , \overline{AD} // \overline{BC} ,$$

$$m (\angle BAD) = 120^{\circ} \text{ and } m (\angle BDC) = 65^{\circ}$$

Find:

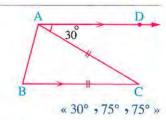


In the opposite figure :

ABC is a triangle in which AC = BC,

$$\overrightarrow{AD}$$
 // \overrightarrow{BC} and m (\angle DAC) = 30°

Find : The measures of the angles of
$$\triangle$$
 ABC

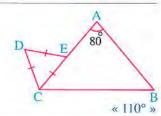


10 In the opposite figure :

$$AB = AC$$
, $m (\angle BAC) = 80^{\circ}$

and
$$CE = ED = CD$$

Find by proof: m (∠ BCD)

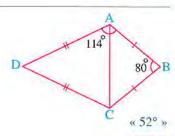


11 In the opposite figure :

$$AB = BC \cdot AD = CD \cdot m (\angle BAD) = 114^{\circ}$$

and m (
$$\angle$$
 B) = 80°

Find:
$$m (\angle ADC)$$

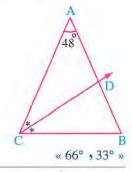


12 In the opposite figure :

AB = AC, m (\angle BAC) = 48°, \overrightarrow{CD} bisects \angle BCA and intersects \overrightarrow{AB} at D

Find:

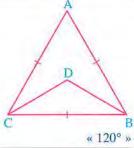
- 1 m (∠ B)
- 2 m (∠ BCD)



13 In the opposite figure :

ABC is an equilateral triangle and the two bisectors of \angle B and \angle C intersect together at D

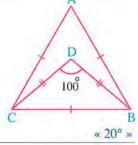
Find: m (∠ BDC)



14 In the opposite figure :

ABC is an equilateral triangle DB = DC and m ($\angle BDC$) = 100°

Find by proof : $m (\angle ABD)$

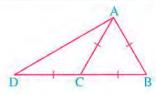


In the opposite figure :

ABC is an equilateral triangle.

 $D \subseteq \overrightarrow{BC}$ such that BC = CD

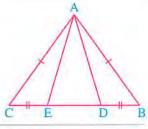
Prove that : $\overline{BA} \perp \overline{AD}$



16 🛄 In the opposite figure :

ABC is an isosceles triangle in which AB = AC , D \in BC and E \in BC , such that BD = EC

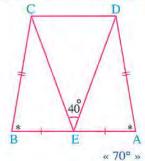
Prove that : $\boxed{1}$ \triangle ADE is an isosceles triangle.



In the opposite figure :

E is the midpoint of \overline{AB} , AD = BC, m ($\angle A$) = m ($\angle B$) and m ($\angle DEC$) = 40°

Find: $m (\angle EDC)$

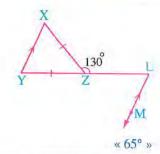




18 [1] In the opposite figure :

$$Z \subseteq \overline{LY}$$
 , $XZ = YZ$, m ($\angle LZX$) = 130° and \overrightarrow{LM} // \overrightarrow{XY}

Find: $m (\angle MLY)$

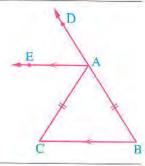


19 In the opposite figure :

$$A \subseteq \overrightarrow{BD}$$
, $AB = AC$ and $\overrightarrow{AE} // \overrightarrow{BC}$

Prove that:

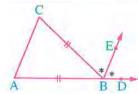
AE bisects ∠ DAC



20 In the opposite figure :

AB = BC and \overrightarrow{BE} bisects $\angle CBD$

Prove that : \overrightarrow{BE} // \overrightarrow{AC}



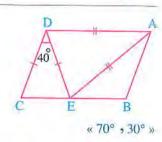
21 In the opposite figure :

ABCD is a parallelogram, $E \in \overline{BC}$,

where AE = AD, DE = DC and m (\angle EDC) = 40°

Find: 1 m (∠ AED)

2 m (∠ BAE)



In the opposite figure :

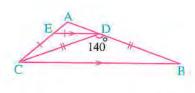
ABC is a triangle in which

 $D \in \overline{AB}$, $E \in \overline{AC}$

where $\overline{DE} // \overline{BC}$, $\overline{DE} = EC$

, DB = DC and m (\angle BDC) = 140°

Find: $m (\angle A)$



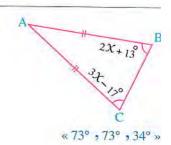
« 120° »

23 In the opposite figure :

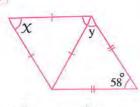
AB = AC, $m (\angle B) = 2 X + 13^{\circ}$

and m (\angle C) = 3 \times – 17°

Find : The measures of the angles of Δ ABC

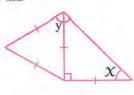


24 In each of the following figures, find the value of the symbol used for the measure of the angle:

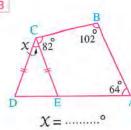


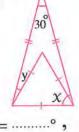
$$X = \cdots \circ$$
,
 $y = \cdots \circ$

2 0

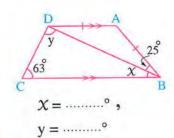


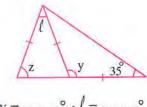
$$\chi = \dots \circ$$
,
 $y = \dots \circ$



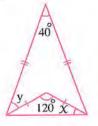


$$\chi = \dots \circ$$
,
 $y = \dots \circ$

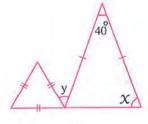




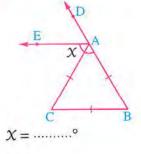
$$y = \dots \circ, \ell = \dots \circ,$$
 $z = \dots \circ$



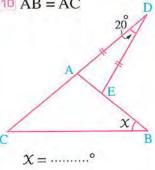
$$\chi = \cdots$$
, $y = \cdots$

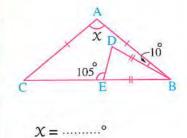


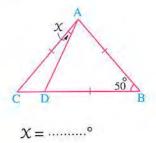
$$X = \dots$$
, $y = \dots$



10 AB = AC

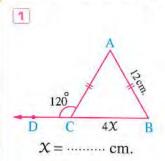


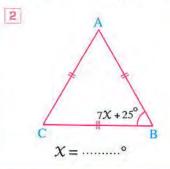


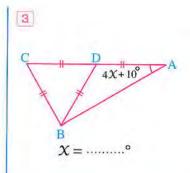


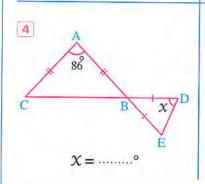


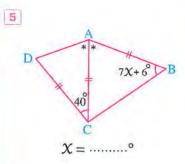
25 Find the value of X in each of the following figures:

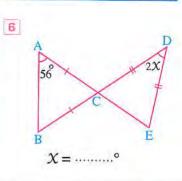




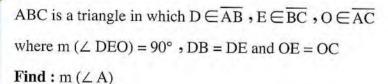


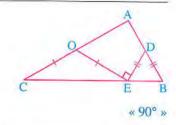






26 In the opposite figure :



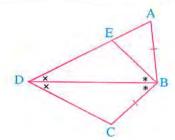


27 In the opposite figure :

BA = BC,
$$E \in \overline{AD}$$

and \overrightarrow{BD} bisects each
of \angle CBE and \angle CDE

Prove that : $m (\angle A) + m (\angle C) = 180^{\circ}$



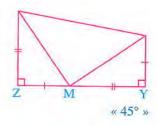
For excellent pupils

28 In the opposite figure :

$$m~(\angle~Y) = m~(\angle~Z) = 90^{\circ}$$

$$, XY = MZ$$
 and $YM = ZL$

Find by proof : $m (\angle MXL)$

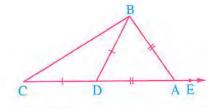


29 In the opposite figure :

ABC is a triangle $D \in \overline{AC}$ such that BD = DC

AD = AB and $E \in \overrightarrow{CA}$

Prove that : $m (\angle BAE) = 4 m (\angle BCD)$

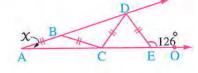


In the opposite figure :

 $m (\angle A) = X^{\circ}, AB = BC = CD = DE$

and m (\angle DEO) = 126°

Find: The value of X



« 18° »

Wonders of numbers

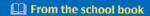
- Pick any positive 2-digit number, add the two digits, and subtract the sum from the original number.
- ≥ Is the difference divisble by 9? C

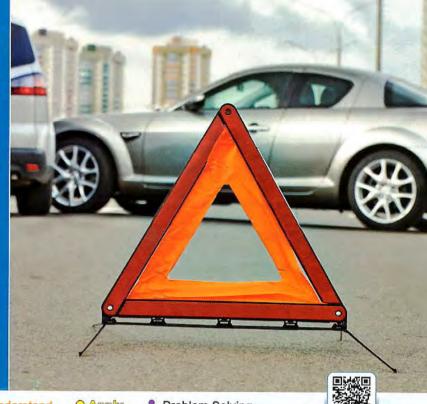


Try other numbers.



The converse of the isosceles triangle theorem





Remember

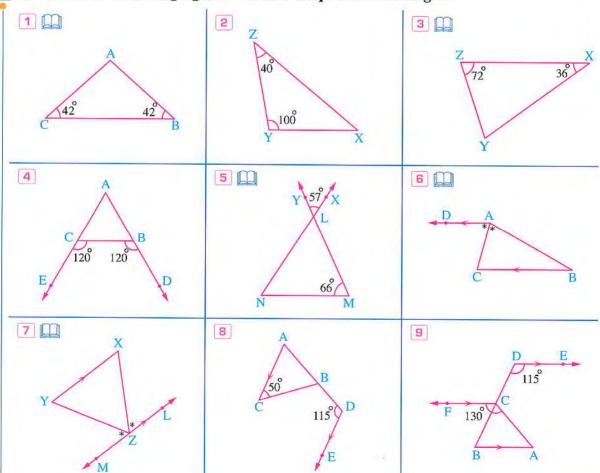
Understand

Apply

Problem Solving

Interactive te

1 In each of the following figures , write the equal sides in length :



2 Complete the following:

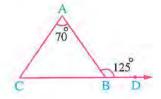
- If the three angles in the triangle are congruent, then the triangle is
- In \triangle ABC, if m (\angle A) = 50° and m (\angle B) = 80°, then the triangle is
- o A If the measure of one angle in the right-angled triangle is 45°, then the triangle is
- o If the measure of one angle of an isosceles triangle is 60°, then the triangle is
- If its perimeter = 18 cm., then BC = cm.
- o In \triangle ABC, CA = CB, m (\angle C) = m (\angle A), then m (\angle B) =

In the opposite figure :

$$D \in \overrightarrow{CB}$$
, m (\angle ABD) = 125°

and m ($\angle A$) = 70°

Prove that: \triangle ABC is an isosceles triangle.

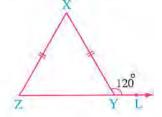


4 In the opposite figure :

$$XY = XZ$$
, $m (\angle XYL) = 120^{\circ}$

and $L \in \overrightarrow{ZY}$

Prove that: Δ XYZ is an equilateral triangle.

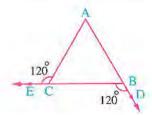


5 In the opposite figure :

$$D \in \overrightarrow{AB}$$
, $E \in \overrightarrow{BC}$ and

$$m (\angle CBD) = m (\angle ACE) = 120^{\circ}$$

Prove that: \triangle ABC is an equilateral triangle.

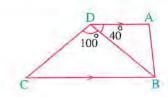


6 In the opposite figure :

$$\overline{AD} // \overline{BC}$$
, m ($\angle ADB$) = 40°

and m (
$$\angle$$
 BDC) = 100°

Prove that : Δ DBC is an isosceles triangle.



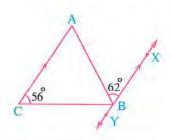
1 In the opposite figure :

$$B \in \overrightarrow{XY}, \overrightarrow{XY} // \overrightarrow{AC}$$

• m (
$$\angle$$
 ABX) = 62° and

$$m (\angle C) = 56^{\circ}$$

Prove that : AC = BC



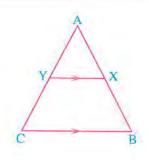
In the opposite figure :

ABC is a triangle in which
$$AB = AC$$
, $X \in \overline{AB}$,

$$Y \in \overline{AC}$$
 and $\overline{XY} // \overline{BC}$

Prove that: $1 \Delta AXY$ is an isosceles triangle.

$$2 XB = YC$$



9 ABC is a triangle in which $D \in \overline{AB}$ and $E \in \overline{BC}$ such that BD = BE

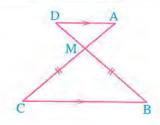
So if
$$\overline{DE} // \overline{AC}$$
, prove that : $AB = BC$

10 In the opposite figure :

$$\overline{AC} \cap \overline{BD} = \{M\}$$
,

$$MB = MC \text{ and } \overline{AD} // \overline{BC}$$

Prove that: MA = MD

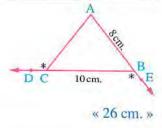


In the opposite figure :

$$B \in \overrightarrow{AE}$$
, $C \in \overrightarrow{BD}$, $AB = 8 \text{ cm.}$,

BC = 10 cm. and m (\angle EBC) = m (\angle ACD)

Find: The perimeter of \triangle ABC

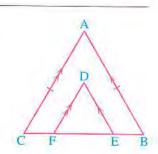


12 🛄 In the opposite figure :

AB = AC, $\overline{DE} // \overline{AB}$ and $\overline{DF} // \overline{AC}$

Prove that:

 $2 \text{ m} (\angle BAC) = m (\angle EDF)$

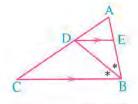


🔞 🛄 In the opposite figure :

ABC is a triangle

 $, \overrightarrow{BD}$ bisects \angle ABC and \overrightarrow{ED} // \overrightarrow{BC} where $\overrightarrow{E} \in \overrightarrow{AB}$

Prove that : \triangle EBD is an isosceles triangle.

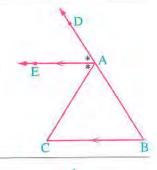


14 In the opposite figure:

 $A \in \overrightarrow{BD}, \overrightarrow{AE} // \overrightarrow{BC}$

and AE bisects ∠ CAD

Prove that : AB = AC

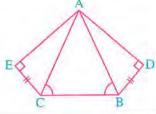


15 In the opposite figure:

BD = CE, $m (\angle ABC) = m (\angle ACB)$

and m (\angle D) = m (\angle E) = 90°

Prove that : $m (\angle DAB) = m (\angle CAE)$



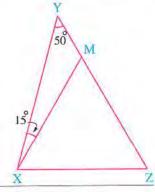
16 In the opposite figure:

YZX is a triangle in which YZ = YX

 $m (\angle Y) = 50^{\circ}$

and m (\angle YXM) = 15°

Prove that: \triangle MZX is an isosceles triangle.

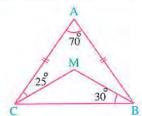


17 In the opposite figure :

ABC is a triangle in which AB = AC, $m (\angle A) = 70^{\circ}$

, m (\angle MCA) = 25° and m (\angle MBC) = 30°

Prove that: \triangle MBC is an isosceles triangle.

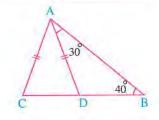


18 In the opposite figure :

AD = AC, $m (\angle B) = 40^{\circ}$

and m (\angle BAD) = 30°

Prove that: AB = CB





 \square ABC is a triangle in which AB = AC, \overrightarrow{BD} bisects \angle ABC and \overrightarrow{CD} bisects \angle ACB

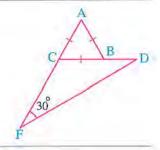
Prove that: \triangle DBC is an isosceles triangle.

20 In the opposite figure :

ABC is an equilateral triangle $, F \in \overrightarrow{AC} ,$

 $D \in \overrightarrow{CB}$ and $m (\angle DFC) = 30^{\circ}$

Prove that: \triangle DCF is an isosceles triangle.



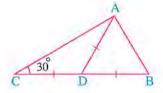
21 In the opposite figure :

 $D \in \overline{BC}$ such that DA = DB = DC

and m (\angle C) = 30°

Prove that:

- 1 Δ ABD is an equilateral triangle.
- 2 Δ ABC is a right-angled triangle.



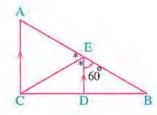
22 III In the opposite figure :

ABC is a triangle in which $E \in \overline{AB}$,

 $\overline{\text{ED}} // \overline{\text{AC}}$, m ($\angle \text{BED}$) = 60°

and EC bisects ∠ AED

Prove that: \triangle AEC is an equilateral triangle.



23 In the opposite figure :

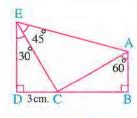
 $C \subseteq \overline{BD}$, $m (\angle B) = m (\angle D) = 90^{\circ}$,

 $m (\angle CED) = 30^{\circ}$

, m (\angle AEC) = 45° , m (\angle BAC) = 60°

and CD = 3 cm.

Find: The length of \overline{AC}



«6 cm.»

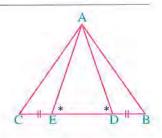
24 📖 In the opposite figure :

 $\angle ADE \equiv \angle AED$

, B , D , E , C are collinear

and BD = CE

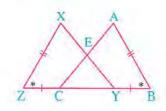
Prove that: \triangle ABC is an isosceles triangle.



 $Y \in \overline{BZ}$, $C \in \overline{BZ}$, AB = XZ,

BY = CZ, $\overline{XY} \cap \overline{AC} = \{E\}$ and $m (\angle B) = m (\angle Z)$

Prove that: Δ EYC is an isosceles triangle.

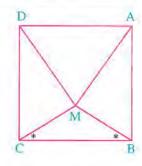


26 In the opposite figure:

ABCD is a square.

M is a point inside it such that : $m (\angle MBC) = m (\angle MCB)$

Prove that: \triangle AMD is an isosceles triangle.



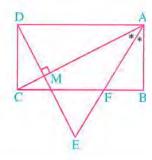
27 In the opposite figure:

ABCD is a rectangle in which

 \overrightarrow{AC} is a diagonal, \overrightarrow{AE} bisects \angle BAC

and $\overline{DE} \perp \overline{AC}$ where $\overrightarrow{AE} \cap \overrightarrow{DE} = \{E\}, \overrightarrow{AC} \cap \overrightarrow{DE} = \{M\}$

Prove that : DA = DE



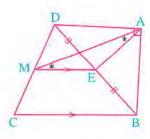
28 In the opposite figure:

ABCD is a quadrilateral in which

m (\angle BAD) = 90°, E is the midpoint of \overline{BD} and $M \in \overline{DC}$

such that $\overline{EM} // \overline{BC}$ and m ($\angle EAM$) = m ($\angle EMA$)

Prove that : BD = BC



29 In the opposite figure :

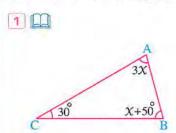
ABC is a triangle in which:

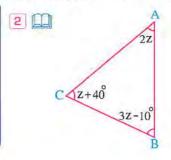
 $m (\angle B) = m (\angle C)$

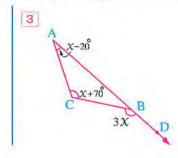
Find: The perimeter of the triangle.



30 In each of the following figures, write the equal sides in length showing the steps of solution:







For excellent pupils

31 Choose the correct answer from those given:

1 If the sum of measures of two congruent angles in a triangle = $\frac{2}{3}$ the sum of measures of its angles, then the triangle is

(a) right-angled.

- (b) isosceles.
- (c) equilateral.
- (d) scalene.
- **2** ABC is a triangle in which m (\angle A) = 30° and m (\angle B) : m (\angle C) = 1 : 4, then A ABC is

(a) right-angled.

- (b) isosceles. (c) equilateral.
- (d) scalene.



Wonders of numbers

- Pick any positive 2-digit number.
- Interchange the two digits to get a new number.
- Subtract the smaller number from the bigger number.
- 🌂 Is the difference divisible by 9 ? 😊



Do the exercise again using different numbers.



Corollaries of the isosceles triangle theorems

From the school book



Remember

Understand

Apply

Problem Solving

Interactive tes

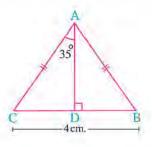
1 Complete the following:

- 1 The straight line drawn from the vertex of the isosceles triangle perpendicular to the base is called
- The number of axes of symmetry in the equilateral triangle equals
- The number of axes of symmetry in the isosceles triangle equals
- The number of axes of symmetry in the scalene triangle equals
- ▶ 5 The median of the isosceles triangle drawn from the vertex angle
 - The bisector of the vertex angle of the isosceles triangle
- The straight line passing through the vertex angle of the isosceles triangle perpendicular to its base
- The axis of the line segment is
 - Any point belonging to the axis of a line segment is from its two terminals.
 - In \triangle ABC, if m (\angle A) = m (\angle B) = 60°, then the number of axes of symmetry of \triangle ABC is
 - In \triangle ABC, if m (\angle A) = m (\angle B) \neq 60°, then the number of axes of symmetry of \triangle ABC is
- In \triangle ABC, if AB = AC, m (\angle A) = 60°, then the number of axes of symmetry of \triangle ABC is

If AB = AC, $\overline{AD} \perp \overline{BC}$, BC = 4 cm, and

m (\angle DAC) = 35°, complete the following:

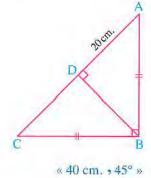
- 1 m (∠ BAD) =°
- 2 m (∠ BAC) =°
- 3 m (∠ B) =°
- BD = cm.
- **5** The axis of symmetry of \triangle ABC is



3 Choose the correct answer from those given:

- If $C \subseteq$ the axis of symmetry of \overline{AB} , then $AC BC = \dots$
 - (a) zero
- (b) 1
- (c) 2
- (d) 4
- In \triangle XYZ, XY = XZ, \overline{XE} is a median, if m (\angle YXE) = 30°, then m (\angle YXZ) =
 - (a) 15°
- (b) 30°
- (c) 60°
- (d) 90°
- In \triangle LMN, LM = LN, \triangle E \bigcirc MN where \triangle LE \triangle MN, if ME = 4 cm., then MN = cm.
 - (a) 12
- (b) 8
- (c) 4
- (d) 2
- of symmetry of the triangle is
 - (a) zero
- (b) 1
- (c) 2
- (d) 3
- In \triangle ABC, m (\angle A) = 40°, m (\angle C) = 100°, then the number of axes of symmetry of the triangle is
 - (a) 1
- (b) 2
- (c) 3
- (d) infinite number.
- The triangle in which the measures of two angles in it are 45°, 65°, then the number of axes of symmetry of the triangle is
 - (a) zero
- (b) 3
- (c)2
- (d) 1
- An isosceles triangle, the measure of one of its angles is 60°, then the number of its axes of symmetry is
 - (a) 4
- (b) 3
- (c) 2
- (d) 1
- ϕ If \triangle ABC has 1 axis of symmetry, m (\angle ABC) = 120°, m (\angle A) =
 - (a) 30°
- (b) 60°
- (c) 90°
- (d) 120°

ABC is a right-angled triangle at B and it is also an isosceles triangle , $\overline{BD} \perp \overline{AC}$ and AD = 20 cm. Find the length of \overline{AC} and m (\angle DBC) , then deduce that Δ BDC is an isosceles triangle.



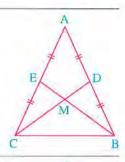
5 In the opposite figure :

 $AB = AC \cdot D \text{ and } E \text{ are the midpoints of } \overline{AB}$ and $\overline{AC} \text{ respectively and } \overline{BE} \cap \overline{CD} = \left\{M\right\}$

Prove that:

 $1 \overrightarrow{AM} \perp \overrightarrow{BC}$

2 AM bisects ∠ BAC

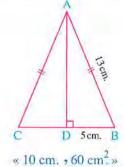


6 In the opposite figure :

In \triangle ABC , AB = AC , $\overline{AD} \perp \overline{BC}$, AB = 13 cm. and BD = 5 cm.

Find:

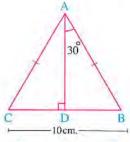
- 1 The length of BC
- Property The area of Δ ABC



In the opposite figure :

AB = AC, BC = 10 cm., $m (\angle BAD) = 30^{\circ}$ and $\overline{AD} \perp \overline{BC}$

- $\underline{1}$ Find the length of each of: \overline{BD} and \overline{AD}
- \blacksquare How many axes of symmetry are there at \triangle ABC?
- \blacksquare Find the area of \triangle ABC



 $\% 5 \text{ cm.}, 5\sqrt{3} \text{ cm.}, 25\sqrt{3} \text{ cm}^2.$

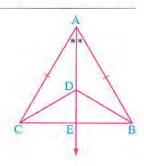
In the opposite figure :

ABC is a triangle in which AB = AC, \overrightarrow{AE} bisects \angle BAC, $\overrightarrow{AE} \cap \overrightarrow{BC} = \{E\}$ and $D \in \overrightarrow{AE}$

Prove that:

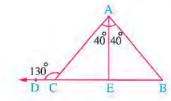
 $BE = \frac{1}{2} BC$

BD = CD





$$C \subseteq \overline{BD}$$
, $m (\angle ACD) = 130^{\circ}$
and $m (\angle BAE) = m (\angle CAE) = 40^{\circ}$



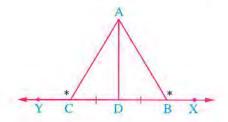
Prove that:

$$1 \overline{AE} \perp \overline{BC}$$

10 In the opposite figure :

$$X \cdot B \cdot C \cdot D$$
 and Y are collinear points \cdot
 \overline{AD} is a median of \triangle ABC and
$$m (\angle ABX) = m (\angle ACY)$$

Prove that : $\overline{AD} \perp \overline{BC}$

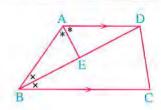


11 In the opposite figure :

ABCD is a quadrilateral in which

 $\overrightarrow{AD} / / \overrightarrow{BC}$, \overrightarrow{BD} bisects $\angle ABC$ and

AE bisects ∠ BAD



Prove that:

$$1 AB = AD$$

$$BE = ED$$

12 In the opposite figure :

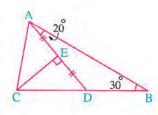
ABC is a triangle in which

$$m (\angle B) = 30^{\circ}, D \in \overline{BC}$$

where m (
$$\angle$$
 BAD) = 20°

, E is the midpoint of \overline{AD} and $\overline{CE} \perp \overline{AD}$

Find: $m (\angle ACE)$



« 40°

In the opposite figure :

ABC is a triangle in which

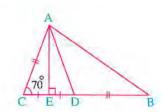
$$m (\angle C) = 70^{\circ}, D \in \overline{BC}$$

where
$$BD = AC$$

, E is the midpoint of \overline{DC}

and $\overline{AE} \perp \overline{DC}$

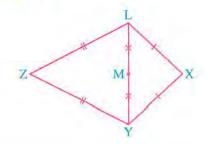
Find: $m (\angle B)$



$$XY = XL$$
, $ZY = ZL$ and $LM = YM$

Prove that:

X, M and Z are on the same straight line.

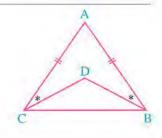


15 In the opposite figure :

ABC is a triangle, D is a point inside it such that

$$m (\angle ABD) = m (\angle ACD)$$
 and $AB = AC$

Prove that : \overrightarrow{AD} is the axis of symmetry of \overrightarrow{BC}

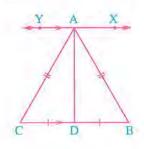


16 In the opposite figure :

ABC is a triangle in which AB = AC,

D is the midpoint of \overline{BC} and \overline{XY} passes through the vertex A such that \overline{XY} // \overline{BC}

Prove that : $\overrightarrow{AD} \perp \overrightarrow{XY}$

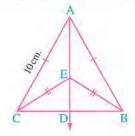


17 In the opposite figure :

$$AB = AC = 10 \text{ cm.}$$
, $EB = EC \text{ and } \overrightarrow{AE} \cap \overrightarrow{BC} = \{D\}$

Prove that : BD = DC and if BC = 6 cm.

Find the length of each of : $\overline{\text{CD}}$ and $\overline{\text{AD}}$

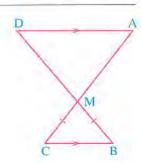


18 In the opposite figure :

$$\overline{AC} \bigcap \overline{BD} = \left\{M\right\}$$
 , $\overline{AD} \mathbin{/\!/} \overline{BC}$ and $MB = MC$

Prove that:

- $\underline{1}$ Δ AMD is an isosceles triangle.
- \blacksquare The axis of symmetry of \triangle AMD is the same of \triangle BMC

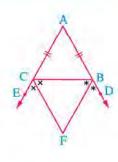


 $AB = AC, D \in \overrightarrow{AB}, E \in \overrightarrow{AC},$

 \overrightarrow{BF} bisects \angle DBC and \overrightarrow{CF} bisects \angle BCE

Prove that:

- \bigcirc \triangle BFC is an isosceles triangle.
- AF is the axis of symmetry of BC



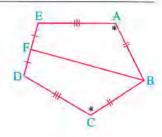
20 🛄 In the opposite figure :

AB = BC, AE = CD,

 $m (\angle BAE) = m (\angle BCD)$

and F is the midpoint of DE

Prove that : $\overline{BF} \perp \overline{DE}$



Choose the correct answer from those given :

- 1 If ABCD is a quadrilateral in which AB = AD and BC = DC, then \overrightarrow{AC} is \overrightarrow{BD}
 - (a) parallel to

- (b) equal to
- (c) the axis of symmetry of
- (d) congruent to
- The triangle whose sides lengths are 2 cm. (x + 3) cm. and 5 cm. becomes an isosceles triangle when $x = \dots$ cm.
 - (a) 1
- (b) 2
- (c) 3
- (d) 4
- If the length of any side in a triangle = $\frac{1}{3}$ of the perimeter of the triangle, then the number of axes of symmetry of the triangle equals
 - (a) 1
- (b) 2
- (c) 3
- (d) zero
- 4 If \overrightarrow{XY} is the axis of symmetry of \overrightarrow{AB} , then
 - (a) AX = BY
- (b) AX = BX
- (c) BY = XY
- (d) AY = BX
- $\boxed{5}$ In the rhombus ABCD, the axis of symmetry of \overline{AC} is
 - (a) BD
- (b) \overrightarrow{AB}
- (c) AD
- (d) CD
- 6 In the square ABCD, BD is the axis of symmetry of
 - (a) \overline{AB}
- (b) AC
- (c) AD
- (d) CD

For excellent pupils

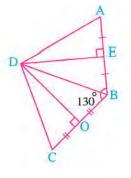
22 In the opposite figure :

ABCD is a quadrilateral in which

$$m (\angle ABC) = 130^{\circ}$$

- E is the midpoint of \overline{AB}
- , O is the midpoint of \overline{BC}
- , $\overline{DE} \perp \overline{AB}$ and $\overline{DO} \perp \overline{BC}$

Find: $m (\angle ADC)$

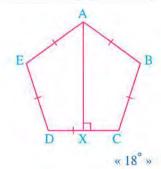


« 100° »

In the opposite figure :

ABCDE is a regular pentagon and $\overline{\text{AX}} \perp \overline{\text{CD}}$

Find: $m (\angle DAX)$



Wonders of numbers

Choose an integer from 1 to 9, multiply it by 9, then multiply the product by 123456789.

Where do you stand?





Inequality



From the school book

Remember

Understand

O Apply

- Problem Solving

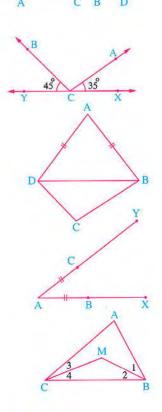
Interactive test

1 Complete each of the following using > or <:

- In the opposite figure:

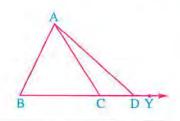
 If C and B belong to \overrightarrow{AD} such that DC < BA, then AC DB
- In the opposite figure:

 If B and C belong to \overrightarrow{AD} where $\overrightarrow{AB} > \overrightarrow{CD}$, then \overrightarrow{AC} BD
- In the opposite figure: If $C \in \overrightarrow{XY}$, $m (\angle ACX) = 35^{\circ}$ and $m (\angle BCY) = 45^{\circ}$, then $m (\angle XCB) \cdots m (\angle ACY)$
- AB = AD, m (\angle DBC) < m (\angle CDB), then m (\angle ABC) m (\angle ADC)



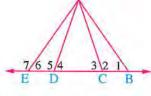
ABC is a triangle, $C \in \overline{BD}$ and $Y \in \overline{CD}$

- , then m (\angle ADY) m (\angle DAC)
- , m (∠ ABC) m (∠ ADY)



2 Use the opposite figure to arrange the given measures ascendingly, where B, C, D and E are collinear:

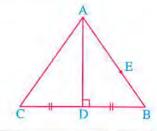
- $1 \text{ m } (\angle 1), \text{ m } (\angle 3)$
- $\boxed{3}$ m (\angle 5), m (\angle 3)
- $5 \text{ m } (\angle 3), \text{ m } (\angle 1), \text{ m } (\angle 5)$
- $2 m (\angle 2) \cdot m (\angle 4)$
- 4 m ($\angle 2$), m ($\angle 6$)
- \mathbb{B} m (\angle 3), m (\angle 5), m (\angle 7)
- $7 \text{ m} (\angle 3), \text{ m} (\angle 1), \text{ m} (\angle 7), \text{ m} (\angle 5)$



3 In the opposite figure :

 $E \in \overline{AB}$, $\overline{AD} \perp \overline{BC}$ and D is the midpoint of \overline{BC}

Prove that : AC > AE

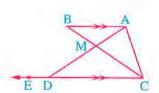


4 🛄 In the opposite figure :

 $\overrightarrow{AB} / \overrightarrow{CD}$, $\overrightarrow{AD} \cap \overrightarrow{BC} = \{M\}$, $E \in \overrightarrow{CD}$ and $E \notin \overrightarrow{CD}$

Prove that:

- $1 \text{ m } (\angle ACD) > \text{ m } (\angle ABC)$
- $2 \text{ m } (\angle ADE) > \text{ m } (\angle ABC)$



5 In the opposite figure:

 $E \in \overline{CB}$ and M is the midpoint of each of \overline{AC} and \overline{BD}

Prove that : $m (\angle ABE) > m (\angle ACD)$

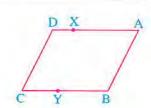


6 In the opposite figure:

ABCD is a parallelogram, $X \in \overline{AD}$ and $Y \in \overline{BC}$

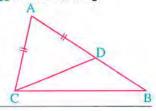
such that DX < BY

Prove that: AX + AB > CY + CD



 $D \in \overline{AB}$ where AD = AC

Prove that : $m (\angle ACB) > m (\angle B)$

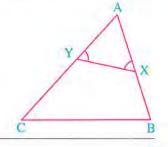


🔋 📖 In the opposite figure :

ABC is a triangle in which: AC > AB, $X \in AB$

and $Y \in \overline{AC}$ where $m (\angle AXY) = m (\angle AYX)$

Prove that: YC > XB

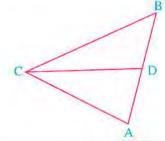


9 In the opposite figure:

ABC is a triangle in which:

 $\overline{AB} \equiv \overline{AC}$ and $D \in \overline{AB}$

Prove that : $m (\angle ADC) > m (\angle ACB)$



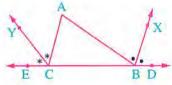
10 In the opposite figure:

 $B \in DE$, $C \in DE$ such that

 $m (\angle ACB) > m (\angle ABC)$

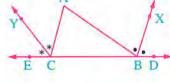
 \overline{BX} bisects \angle ABD and \overrightarrow{CY} bisects \angle ACE

Prove that: $m (\angle ABX) > m (\angle ACY)$



11 🛄 M is a point inside the triangle ABC

Prove that: $m (\angle AMB) > m (\angle ACB)$



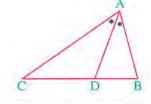
For excellent pupils

12 In the opposite figure:

ABC is a triangle in which: $m (\angle B) > m (\angle C)$, $D \subseteq \overline{BC}$

such that AD bisects ∠ BAC

Prove that : ∠ ADC is an obtuse angle.

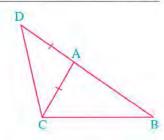


13 In the opposite figure:

ABC is a triangle in which: $m (\angle ACB) > m (\angle ABC)$

, $A \subseteq BD$ such that AC = AD

Prove that: ∠ BCD is an obtuse angle.



November tests



onAlgebra and Statistics

Test



10

Choose the correct answer from the given ones:

(3 marks)

$$(a)\mathbb{R}_{\perp} \cap \mathbb{R}_{\perp}$$

$$(d)Q \cap Q(b)$$

$$(a\sqrt{3} + \sqrt{2})$$

(b)
$$\sqrt{3} - \sqrt{2}$$

$$(c)\sqrt{3} \times \sqrt{2}$$

(d)
$$-\sqrt{3} - \sqrt{2}$$

The volume of the sphere whose diameter length is 6 cm. equals cm.³

Complete the following:

(3 marks)

The edge length of a cube is 4 cm., then its total area = \cdots cm².

The multiplicative inverse of the number $\frac{\sqrt{2}}{6}$ is

If
$$x^2 = \frac{8}{9}$$
, then x in the simplest form =

Simplify to the simplest form :
$$2\sqrt{18} + \sqrt{50} + \frac{1}{3}\sqrt{162}$$

(2 marks)

4 If
$$X = [-1, 4]$$
 and $Y = [3, ∞[$

, find the following using the number line :



Choose the correct answer from the given ones:

(3 marks)

- The dimensions of a cuboid are $\sqrt{2}$ cm., $\sqrt{3}$ cm. and $\sqrt{6}$ cm., then its volume = cm³.
 - (a) $\sqrt{30}$
- (b) $\sqrt{6}$
- (c) 6

(d) $\sqrt{18}$

- **2** {8,9,10}]8,10[= ············
 - (a) Ø

- (b) {8,10}
- (c) {9}
- (d) N
- 3 The additive inverse of the number $(\sqrt{2} \sqrt{5})$ is
 - (a) $\sqrt{2} + \sqrt{5}$
- (b) $\sqrt{5} \sqrt{2}$
- (c) $\sqrt{2} \sqrt{5}$
- (d) $-\sqrt{2}-\sqrt{5}$

Complete the following:

(3 marks)

- 1 The multiplicative neutral in $\mathbb R$ is and the additive neutral in $\mathbb R$ is
- $\boxed{2}$ $\sqrt{5}$, $\sqrt{20}$, $\sqrt{45}$, $\sqrt{80}$, (in the same pattern)
- $\sqrt[3]{\sqrt{2}} + \sqrt[3]{2} = \cdots$
- Find the lateral area of a right circular cylinder of volume 924 cm³. if its height equals 6 cm. $(\pi \simeq \frac{22}{7})$ (2 marks)
- If $a = \sqrt{3} + \sqrt{2}$ and $b = \frac{1}{\sqrt{3} + \sqrt{2}}$
 - , find in the simplest form the value of : $a^2 b^2$

November tests



on Geometry





Choose the correct answer from the given ones:

(3 marks)

- 1 The measure of an interior angle in an isosceles triangle is 60°, then the number of axes of symmetry of this triangle is
 - (a) 4

(b) 3

(c) 2

(d) 1

2 In the opposite figure:

If $C \in \overrightarrow{AD}$ and $B \in \overrightarrow{AD}$ where $\overrightarrow{AB} > \overrightarrow{DC}$

, then DB AC

(a) >

(b) <

(c) =

(d) ≥

A

BC

- 3 In \triangle ABC, AB = 5 cm., BC = 7 cm. and AC = 6 cm.
 - , then m (\angle A) m (\angle C)
 - (a) >

(b) <

(c) =

(d) =

Complete the following:

(3 marks)

- 1 The straight line passing through the vertex angle of an isosceles triangle perpendicular to its base
- The lengths of two sides in a triangle are not equal, then the greater side in length is opposite to
- 3 If M \in the axis of \overline{XY} , then $\frac{5 \text{ MX}}{4 \text{ MY}} = \cdots$

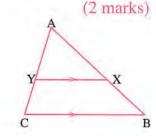
In the opposite figure :

ABC is a triangle,

AB > AC and $\overline{XY} // \overline{BC}$

Prove that:

 $m(\angle AYX) > m(\angle AXY)$

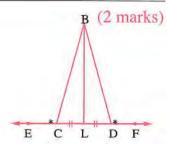


In the opposite figure :

CL = DL

 $, m (\angle BCE) = m (\angle BDF)$

Prove that : $\overline{BL} \perp \overline{CD}$





Choose the correct answer from the given ones:

(3 marks)

1 In the opposite figure:

If
$$C \in \overrightarrow{XY}$$
, $m (\angle ACX) = 35^{\circ}$

and m (
$$\angle$$
 BCY) = 45°

, then m (
$$\angle$$
 XCB) ……… m (\angle ACY)



$$(c) =$$

- If $C \subseteq$ the axis of symmetry of \overline{AB} , then $AC BC = \cdots$
 - (a) zero

(b) 1

(c) 2

- (d) 4
- In the square ABCD, BD is the axis of symmetry of
 - (a) AB

(b) AC

- (c) AD
- (d) CD

2 Complete the following:

(3 marks)

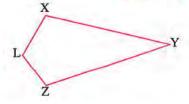
- The bisector of the vertex angle of an isosceles triangle
- \supseteq In \triangle XYZ, if XZ > XY, then m (\angle Z) m (\angle Y)
- The number of axes of symmetry of the scalene triangle equals
- In the opposite figure :

(2 marks)

XY > XL and YZ > ZL

Prove that:

 $m (\angle XLZ) > m (\angle XYZ)$

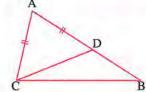


In the opposite figure :

 $D \in AB$ where AD = AC

Prove that:

 $m (\angle ACB) > m (\angle B)$



1

Total mark

10

1 Choose the correct answer from those given:

(3 marks)

$$(a) \mathbb{R}_{\perp} \cap \mathbb{R}_{\perp}$$

$$\textcircled{b} \mathbb{R}_{+} \cup \mathbb{R}_{-}$$

$$\textcircled{d} @ \cap \overset{\circ}{Q}$$

2 The multiplicative inverse of the number
$$\frac{\sqrt{2}}{6}$$
 is

$$(a)\sqrt{3}$$

ⓑ
$$3\sqrt{2}$$

$$\bigcirc \frac{\sqrt{2}}{2}$$

$$(b)$$
 12 π

$$\odot$$
 36 π

$$\bigcirc$$
 288 π

(3 marks)

1 The edge length of a cube is 4 cm., then its total area =
$$\cdots$$
 cm².

2 The conjugate number of the number
$$\frac{1}{\sqrt{3}-\sqrt{2}}$$
 is

3 If
$$x^2 = \frac{8}{9}$$
, then x in the simplest form =

Simplify to the simplest form :
$$2\sqrt{18} + \sqrt{50} + \frac{1}{3}\sqrt{162}$$

(2 marks)

4 If
$$X = [-1, 4]$$
 and $Y = [3, \infty[$

, find the following using the number line :

$$X \cup Y$$
 , $Y - X$



Total mark

10

1 Choose the correct answer from those given :

(3 marks)

- 1 The dimensions of a cuboid are $\sqrt{2}$ cm., $\sqrt{3}$ cm. and $\sqrt{6}$ cm.
 - , then its volume = \cdots cm³.
 - $(a)\sqrt{30}$
- $\bigcirc \sqrt{6}$
- © 6

 $(d)\sqrt{18}$

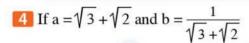
- **2** {8,9,10}]8,10[= ·················
 - (a) Ø

- **ⓑ** {8,10}
- (c) {9}
- \bigcirc \mathbb{N}
- 3 The additive inverse of the number $(\sqrt{2} \sqrt{5})$ is
 - (a) $\sqrt{2} + \sqrt{5}$
- ⓑ $\sqrt{5} \sqrt{2}$
- $\bigcirc \sqrt{2} \sqrt{5}$
- (d) $-\sqrt{2}-\sqrt{5}$

2 Complete the following:

(3 marks)

- 1 The multiplicative neutral in $\mathbb R$ is \cdots and the additive neutral in $\mathbb R$ is \cdots
- $2\sqrt{5}$, $\sqrt{20}$, $\sqrt{45}$, $\sqrt{80}$, (in the same pattern)
- $\sqrt[3]{2} + \sqrt[3]{2} = \cdots$
- Find the lateral area of a right circular cylinder of volume 924 cm³ if its height equals 6 cm. $(\pi \simeq \frac{22}{7})$



, find in the simplest form the value of : $a^2 - b^2$



Total mark 10

1 Choose the correct answer from those given:

(3 marks)

- 1 The measure of an interior angle in an isosceles triangle is 60°, then the number of axes of symmetry of this triangle is
 - (a) 4

(b) 3

(c) 2

(d) 1

- 2 If $C \in \overrightarrow{AD}$ and $B \in \overrightarrow{AD}$ where $\overrightarrow{AB} > \overrightarrow{DC}$
 - , then DB AC
 - (a)>

(c) =

- (d)≥
- - (a)>

(b) <

(c) =

(d) =

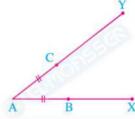
2 Complete the following:

(3 marks)

- 1 The straight line passing through the vertex angle of the isosceles triangle perpendicular to
- 2 The lengths of two sides in a triangle are not equal, then the greater side in length is opposite to
- 3 In the opposite figure :

If AB = AC and AY > AX

, then BX CY



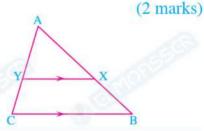
3 In the opposite figure :

ABC is a triangle,

AB > AC and $\overline{XY} // BC$

Prove that:

 $m (\angle AYX) > m (\angle AXY)$



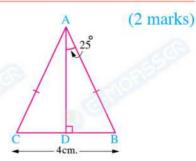
4 In the opposite figure :

ABC is a triangle AB = AC

- $, AD \perp BC, m (\angle BAD) = 25^{\circ}$
- BC = 4 cm.

Find:

- 1 m (∠ DAC)
- 2 The length of DC





Total mark

10

1 Choose the correct answer from those given :

(3 marks)

1 In the opposite figure :

If
$$C \in \overrightarrow{XY}$$
, $m (\angle ACX) = 35^{\circ}$

and m (
$$\angle$$
 BCY) = 45°

, then m (
$$\angle$$
 XCB) m (\angle ACY)

(a)>



- d) otherwise.
- 2 If $C \in \text{the axis of symmetry of } \overline{AB}$, then $AC BC = \overline{AB}$
 - (a) zero
- (b) 1

(c) 2

- (d) 4
- 3 In the square ABCD, BD is the axis of symmetry of
 - (a) AB

- (b) AC
- (c) AD
- (d) \overline{CD}

2 Complete the following:

(3 marks)

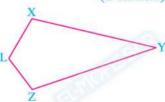
- 1 The bisector of the vertex angle of the isosceles triangle
- 2 In \triangle XYZ, if XZ > XY, then m (\angle Z) m (\angle Y)
- 3 The number of axes of symmetry of the scalene triangle equals
- 3 In the opposite figure :

XY > XL and YZ > ZL

Prove that:

 $m (\angle XLZ) > m (\angle XYZ)$



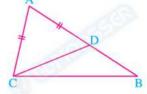


4 In the opposite figure :

 $D \in \overline{AB}$ where AD = AC

Prove that:

 $m (\angle ACB) > m (\angle B)$





(Algebra and Statistics)

Answers of Test

11c

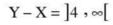
2 (b)

3 (C)

2 1 96

- $2\sqrt{3}-\sqrt{2}$
- $3 \pm \frac{2\sqrt{2}}{3}$

- $2 \times 3\sqrt{2} + 5\sqrt{2} + \frac{1}{3} \times 9\sqrt{2}$ $=6\sqrt{2}+5\sqrt{2}+3\sqrt{2}=14\sqrt{2}$
- $\boxed{4} X \cup Y = [-1, \infty[$





Answers of Test

11 1 C

2 (b)

3 (b)

- 2 1 1, zero
- 2 125
- $32\sqrt[3]{2}$
- 3 : The volume of the cylinder = π r² h

$$\therefore 924 = \frac{22}{7} \times r^2 \times 6$$

$$r^2 = \frac{924 \times 7}{22 \times 6} = 49$$

$$\therefore$$
 r = 7 cm.

- :. The lateral area = $2 \pi r h = 2 \times \frac{22}{7} \times 7 \times 6 = 264 \text{ cm}^2$.
- 4 : $b = \frac{1}{\sqrt{3} + \sqrt{2}} \times \frac{\sqrt{3} \sqrt{2}}{\sqrt{3} \sqrt{2}} = \frac{\sqrt{3} \sqrt{2}}{3 2}$

:.
$$a^2 - b^2 = (a - b) (a + b)$$

$$= (\sqrt{3} + \sqrt{2} - \sqrt{3} + \sqrt{2})(\sqrt{3} + \sqrt{2} + \sqrt{3} - \sqrt{2}) = 2\sqrt{2} \times 2\sqrt{3}$$

$$= 4\sqrt{6}$$

Answers of Test







- 2 1 bisects each of the base and the vertex angle.
 - 2 the angle of the greater measure.
 - 3 <

In Δ ABC:

$$\therefore m (\angle C) > m (\angle B) \quad (1)$$

 $\therefore \overline{XY} // \overline{BC}$ and \overrightarrow{AC} is a transversal.

$$\therefore$$
 m (\angle AYX) = m (\angle C) (corresponding angles) (2)

Similarly: $\therefore \overline{XY} // \overline{BC}$, \overrightarrow{AB} is a transversal.

$$\therefore$$
 m (\angle AXY) = m (\angle B) (corresponding angles) (3)

From (1), (2) and (3):

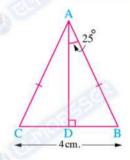
$$\therefore$$
 m (\angle AYX) > m (\angle AXY)

(Q.E.D.)

$$4 : AB = AC, \overline{AD} \perp \overline{BC}$$

$$\therefore$$
 m (\angle DAC) = m (\angle DAB) = 25° (First req.)

, DC = DB =
$$\frac{4}{2}$$
 = 2 cm. (Second req.)



Answers of Test







2 1 bisects the base and is perpendicular to it.

- 2 <
- 3 zero.
- Construction : Draw YL

Proof:

In $\triangle XYL : : : XY > XL$

$$\therefore$$
 m (\angle XLY) > m (\angle XYL)

(1)

In $\triangle ZYL : :: YZ > ZL$

$$\therefore$$
 m (\angle ZLY) > m (\angle ZYL)

(2)

Adding (1) and (2):

$$\therefore m (\angle XLY) + m (\angle ZLY) > m (\angle XYL) + m (\angle ZYL)$$

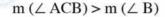
$$\therefore$$
 m (\angle XLZ) > m (\angle XYZ)

(Q.E.D.)

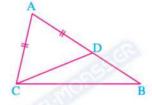


$$\therefore$$
 AD + BD > AC

- $\therefore AB > AC$
- ∴ In ∆ABC:



(Q.E.D.)





First: Choose the correct answer:

$$a\frac{-\sqrt{3}}{6}$$

- **b** $6\sqrt{3}$ **c** $2\sqrt{3}$ **d** $-2\sqrt{3}$
- The volume of the cuboid, whose dimensions are $\sqrt{3}$, $\sqrt{2}$ and $\sqrt{6}$ cm is
 - **a** 6

- **b** 36
- **©** 6√6
- **18** $\sqrt{2}$

- 3 \sqrt{8} \sqrt{2}
 - a $\sqrt{2}$

- **b** $\sqrt{6}$ **c** $2\sqrt{2}$
- **a** 2

Second: Complete the following sentences:

- 1 If the sum of the lengths of all edges of a cube is 48 cm, then its volume is
- $3\sqrt{\frac{1}{2}} + \sqrt{\frac{1}{2}} = \dots$

Third: Answer the following:

- 1) If $x = \sqrt{5} 2$ and $y = \sqrt{5} + 2$, find the value of each of the following:
 - **a** x + y
 - **b** ху

2 Find: $\sqrt[3]{54} + \sqrt[3]{16} - \sqrt[3]{250}$



First: Choose the correct answer:

$$\sqrt[3]{-64} + \sqrt{16} = \dots$$

a zero

- **6** 8
- **C** 8
- **a** ± 8
- 2 If the total area of a cube is 96 cm^2 , then the area of one face = cm².
 - **a** 16

- **6**4
- **©** 24
- **d** 48
- - **a** {- 3}

ⓑ]3,∞[

©]-∞,3[

6] - ∞, - 3[

Second: Complete the following sentences:

- 1 If the edge length of a cube is 6 cm, then its volume = cm³.
- $(\sqrt{16} \sqrt{10})(\sqrt{16} + \sqrt{10}) = \dots$
- 3 If $\sqrt{X} = \sqrt{2} + 1$, then x = ...

Third: Answer the following:

ullet Find the solution set for inequality in $\mathbb R$ in the form of an interval:

$$5 x - 3 < 2 x + 9$$

² The volume of a sphere is 4188 cm³. Find its radius length. ($\pi = 3.141$)

PONY - 2 Prep - First Term

 $\chi = \sqrt{\frac{\ell^2}{c} + C - \frac{\ell}{2}} \qquad co_2$



First: Choose the correct answer:

$$\sqrt[3]{\frac{2}{9}} = \dots$$

$$a^{\frac{3\sqrt{6}}{3}}$$

b
$$\sqrt[3]{\frac{1}{6}}$$

2 If
$$x = \frac{\sqrt{6}}{\sqrt{2}}$$
, then $x^{-1} = \dots$.

a
$$\sqrt{3}$$

$$\mathbf{C} \frac{\sqrt{3}}{2}$$

$$\mathbf{d} \frac{\sqrt{3}}{3}$$

Second: Complete the following sentences:

$$(\sqrt{3} + \sqrt{2})^2 = \dots$$

3 If
$$1 - x > 4$$
, then the S.S of $X =$

Third: Answer the following:

1 Find the lateral area of a right circular cylinder with a volume of 924 cm² and a height of 6 cm.

2 If $x = \sqrt{5} - \sqrt{2}$ and $y = \frac{3}{\sqrt{5} - \sqrt{2}}$, prove that x and y are conjugate numbers, then find the value of " $x^2 - 2xy + y^2$ ".



First: Choose the correct answer:

- $\sqrt{8} \sqrt{2} = \dots$
 - $a\sqrt{2}$

- $\mathbf{6}\sqrt{6}$
- **©** $2\sqrt{2}$
- **6** 2
- 2 The volume of the cuboid, whose dimensions are $\sqrt{3}$, $\sqrt{2}$ and $\sqrt{6}$ cm is
 - **a** 6

- **6** 36
- **©** 6√6
- **18** $\sqrt{2}$
- - **a**]-1,1]

- [-1,1[
- **©**]-1,1[
- \bigcirc [-1,1]

Second: Complete the following sentences:

- 1 If the sum of the lengths of all the edges of a cube is 48 cm, then its volume is
- $\sqrt{2} \sqrt{a} + \sqrt{18} = 4\sqrt{2}$, if a = ...
- 3 The additive inverse of the number $\sqrt[3]{-8}$ is

Third: Answer the following:

Find the height of a right circular cylinder whose height is equal to its base radius length and whose volume is 27 π cm³.

2 Find in \mathbb{R} the solution set of the inequality: 4x + 3 > 5x + 2 > 4x, then represent it on the number line.

Model (5)

First: Choose the correct answer:

- If a right circular cylinder whose base radius length is r cm and whose height equals the length of its diameter, then its volume is cm³.
 - $\mathbf{a} \pi r^3$

- $\mathbf{h} \mathbf{\pi} \mathbf{r}^2$
- $\mathbf{G} 2\pi r^3$
- \mathbf{d} 2 \mathbf{r}^3

۲0,

- - $a = -\infty$, 2
- **b** $]-\infty$, -2[**c**]-2, $\infty[$ **d**]2, $\infty[$
- 3 If $X = \sqrt{7} + \sqrt{3}$ and $y = \sqrt{28} + \sqrt{12}$, then $x = \dots$.
 - a y

- $\frac{1}{2}y$
- **C** 2 y
- \mathbf{O} \mathbf{V}^2

Second: Complete the following sentences:

- 1) The conjugate number of the number $1 + \frac{7}{\sqrt{7}}$ in the simplest form is
- 2 If $2\sqrt{27} 2\sqrt{48} = X\sqrt{3}$, then X = ...
- ③ If $X = \sqrt{a} \sqrt{b} = 10$ and $Y = \sqrt{a} + \sqrt{b} = 3$, find $x^2 y^2 = \dots$.

Third: Answer the following:

• Find in \mathbb{R} the S.S of the inequality: 5x - 3 < 2x + 9

2 A metallic sphere with a diameter of 6 cm has been melted and changed into a right circular cylinder with a base radius of 3 cm. Find its height.

Model 1

First:

- $1 2\sqrt{3}$

Second:

- 1 64 cm³
- $2\sqrt{3}-\sqrt{2}$
- $\sqrt{2}$

Third:

- ① (a) $x + y = (\sqrt{5} 2) + (\sqrt{5} + 2)$ $= 2\sqrt{5}$
 - $x y = (\sqrt{5} 2)(\sqrt{5} + 2)$ = 5 - 4 = 1
- $\sqrt{2}\sqrt[3]{2 \times 27} + \sqrt[3]{2 \times 8} \sqrt[3]{2 \times 125}$ $3\sqrt[3]{2} + 2\sqrt[3]{2} - 5\sqrt[3]{2} = zero$

Model 2

First:

- 1 zero
- **2** 16 **3**] − ∞ , − 3[

Second:

- 1 216
- 2 6

Third:

- 0.5 x 2 x < 9 x + 3
 - $3 x < 12 \div 3$

 - x < 4 $S.S = 1 \infty$, 4[
- 2 : The volume of sphere = $\frac{4}{3} \pi r^3$ $4,188 = \frac{4}{7} \times \frac{22}{7} \times r^3$ $r^3 = 1.000$ $\therefore r = \sqrt[3]{1.000}$
 - = 10 cm

Model 3

First:

- $1\frac{\sqrt[3]{6}}{7}$ $2\frac{\sqrt{3}}{7}$ 3 100

Second:

- $1\sqrt{5} \sqrt{3}$ 2 5 + 2 $\sqrt{6}$
- 3] ∞ , 3[

Third:

Since volume of the cylinder =

$$Tr^2 h$$

$$924 = \frac{22}{7} \times r^2 \times 6$$

- $r^2 = 49$ r = 7 cm
- ∴ Lateral area = $2\pi rh$

$$= 2 \times \frac{22}{7} \times 7 \times 6 = 264 \text{ cm}^2$$

- 2 $y = \frac{3}{\sqrt{5} \sqrt{2}} \times \frac{\sqrt{5} + \sqrt{2}}{\sqrt{5} + \sqrt{2}}$
 - $=\frac{3(\sqrt{5}+\sqrt{2})}{3}=\sqrt{5}+\sqrt{2}$ since $x = \sqrt{5} - \sqrt{2}$

and
$$v = \sqrt{5} + \sqrt{2}$$

: x, y are conjugate numbers.

since
$$(x - y)^2 = x^2 - 2 \times y + y^2$$

$$\therefore x - y = (\sqrt{5} - \sqrt{2}) - (\sqrt{5} + \sqrt{2})$$

$$=\sqrt{5}-\sqrt{2}-\sqrt{5}-\sqrt{2}=-2\sqrt{2}$$

$$\therefore (x - y)^2 = (-2\sqrt{2})^2 = 4 \times 2 = 8$$

Model 4

First:

- $\sqrt{2}$
- 3 [-1,1[

Second:

- 1 64 cm³
- 2 2
- 3 7

Third:

- 1) The volume = π r^2 h
- r = r
- $\therefore 27 \ \mathbb{T} = \mathbb{T} \ r^3 \quad \therefore r^3 = 27$
- \therefore r = 3 cm

since radios of base equals to height

- ∴ height equals to 3 cm.
- 24x + 3 > 5x + 2 > 4x

(subtract 4x from all sides)

$$4x - 4x + 3 > 5x - 4x + 2 > 4x - 4x$$

$$3 > x + 2 > 0$$

(subtract 2 from all sides)

$$3-2 > x+2-2 > 0-2$$

$$1 > x > -2$$

$$: S.S =]-2, 1[$$



Model 5

First:

- $1 2\pi r^3$
- 2]-2,∞[
- 3 2 y

Second:

- 1 $\sqrt{7}$
- 3 30

Third:

0.5x - 3 < 2x + 9

$$5x - 2x < 9 + 3$$

$$3x < 12 \div 3$$

2 The volume of sphere $=\frac{4}{3}\pi r^3$ $=\frac{4}{3} \times \frac{22}{7} (3)^3 = \frac{792}{7} \text{ cm}^3$

Since the volume of sphere = The volume of the cylinder.

 \therefore The volume of the cylinder =

$$\pi r^2 h$$

$$\frac{792}{7} = \frac{22}{7} \times (3)^2 \times h$$

$$\therefore$$
 h = 4 cm

First: Choose the correct answer:

- In Δ XYZ, $\overline{XY} = \overline{XZ}$, and \overline{XE} is a median. If m (∠ YXE) = 30°, then m (∠ YXZ) =
 - **a** 15°

- **6** 30°
- **G** 60°
- **d** 90°
- 2 In Δ ABC, if AB < AC, then m (\angle B) $\boxed{}$ m (\angle C).
 - a <

- **(**) >
- **C** =
- **6** ≤
- - a zero

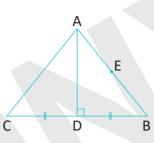
- **b** 1
- **G** 2
- **3**

Second: Complete the following sentences:

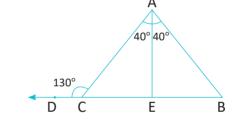
- 1 In \triangle ABC, AB = 7 cm, BC = 5 cm, and AC = 6 cm, then the smallest angle in measure is
- 2 The straight line perpendicular to a line segment at its midpoint is called
- 3 In the right-angled triangle, the is the longest side.

Third: Answer the following:

1 $E \in \overline{AB}$, $\overline{AD} \perp \overline{BC}$, and D is the midpoint of BC. Prove that AC > AE.



② $C \in \overline{BD}$, $m(\angle ACD) = 130^{\circ}$ and $m(\angle BAE) = m(\angle CAE) = 40^{\circ}$. Prove that:



b E is the midpoint of \overline{BC} .

a $\overline{AE} \perp \overline{BC}$.

First: Choose the correct answer:

- 1 If Δ ABC has 1 axis of symmetry, and m (\angle ABC) = 120°, then m (\angle A) =
 - **a** 90°

- **6** 120°
- **G** 60°
- **d** 30°
- 2 In \triangle ABC, if m (\angle C) = 100°, then its longest side is
 - AB

CB

AC

- **d** otherwise
- 3 If a triangle has two angles measuring 45° and 65°, then the number of axes of symmetry of the triangle is
 - a zero

- **b** 1
- **C** 2
- **d** 3

Second: Complete the following sentences:

- 1 In \triangle ABC, AB = 10 cm, BC = 4 cm, and AC = 5 cm, then the smallest angle in measure is
- 2 In \triangle ABC, if m (\angle A) = m (\angle B) = 60°, then the number of axes of symmetry of \triangle ABC is
- 3 The median of the isosceles triangle drawn from the vertex angle is

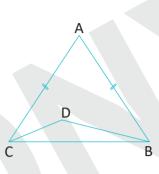
Third: Answer the following:

1 In the opposite figure:

ABC is a triangle, in which: AB = AC and DB > DC.

Prove that:

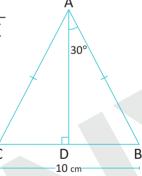
 $m (\angle ABD) > m (\angle ACD)$.



- 2 In the opposite figure:

AB = AC, BC = 10 cm, m (\angle BAD) = 30°, and $\overline{AD} \perp \overline{BC}$

- a Find the length of each of \overline{BD} and \overline{AD} .
- **ⓑ** Find the area of \triangle ABC.





First: Choose the correct answer:

- 1 If C ∈ the axis of symmetry of AB, then AC BC =
 - a zero

- **b** 1
- **G** 2
- **6** 4
- The measure of the interior angle of the equilateral triangle equals

•

a 90°

- **6** 120°
- **G** 60°
- **d** 30°

3 In the opposite figure:

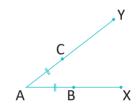
If AB = AC and AY > AX, then $BX \longrightarrow CY$.

a <

(b) >

C =

d ≤



Second: Complete the following sentences:

- 1 In \triangle ABC, AB = 2 cm, BC = 4.2 cm, and AC = 5.6 cm, then the greatest angle in measure is
- 2 The bisector of the vertex angle of the isosceles triangle

The straight line passing through the vertex angle of the isosceles triangle perpendicular to its base

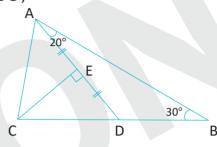
Third: Answer the following:

1 In the following figure:

ABC is a triangle, in which $(\angle B) = 30^{\circ}$, $D \in \overline{BC}$,

 $m (\angle BAD) = 20^{\circ}, E \text{ is the midpoint}$ of \overline{AD} , and $\overline{CE} \perp \overline{AD}$.

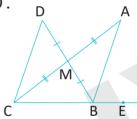
Find m (∠ ACE).



In the following figure:

 $E \in \overline{CE}$ and M is the midpoint of each of \overline{AC} and \overline{BD} .

Prove that: $m (\angle ABE) > m (\angle ACD)$.



Model 1

First:

- 1 60°
- 2 >
- 3 1

Second:

- **1** ∠ A
- axis of symmetry
- hypotenuse

Third:

- $0 : AD \perp BC$ from its midpoint.
 - : AD is the axis of symmetry of BC.
 - $\therefore AB = AC$
 - $: E \in \overline{AB}$
 - $\therefore AB > AE$
 - $\therefore AC > AE$
- $2 : C \in \overline{DB}, m (\angle ACD) = 130^{\circ}$
 - ∴ m (\angle ACB) = 180 130 = 50°

From Δ ABC:

- \therefore m (\angle B) = 180 (80 + 50) = 50°
- \therefore m (\angle B) = m (\angle ACB)
- $\therefore \Delta$ ABC is an isosceles triangle.
- ∴ AE bisects ∠ BAC.
- \therefore AE \perp BC, E is the midpoint of BC

Model 2

First:

- 1 30°
- ² AB
- 3 zero

Second:

- **1** ∠ A
- 2 3
- 3 perpendicular to the base and bisects it

Third:

- 1 In Δ ABD:
 - : DB > DC
 - \therefore m (\angle DBC) < m (\angle DCB)------
 - In Δ ABC:
 - : AB = AC
 - $\therefore m (\angle ABC) = m (\angle ACB)$ By subtracting 1 and 2
 - \therefore m (\angle ABC) m (\angle DBC) > m (\angle ACB) m (\angle DCB)
 - \therefore m (\angle ABD) > m (\angle ACD)
- ② :: AB = AC, AD ⊥ BC ∴ BD = $\frac{1}{2}$ BC = 5 cm,
 - $m (\angle BAC) = 2 \times 30 = 60^{\circ}$
 - \therefore \triangle ABC is an equilateral triangle. In \triangle ADB (which is a right-angled triangle at D):
 - : AB = 10 cm
 - $\therefore AD = \sqrt{(10)^2 (5)^2} = 5\sqrt{3} \text{ cm}$
 - ∴ The area of \triangle ABC = $\frac{1}{2}$ × 10 × 5 $\sqrt{3}$ = 25 $\sqrt{3}$ cm²

Model 3

First:

- 1 zero
- 2 60°
- 3 <

Second:

- **1** ∠ B
- 2 bisects the base and is perpendicular to it
- 3 bisects each of the base and vertex angle

Third:

- 1 In Δ ACD:
 - \therefore E is the midpoint of \overrightarrow{AD} and $\overrightarrow{CE} \perp \overrightarrow{AD}$
 - \therefore DC = AC
 - \therefore \triangle ACD is an isosceles triangle.
 - \therefore \angle ADC is an exterior angle of \triangle ADB.
 - \therefore m (\angle ADC) = 20 + 30 = 50°

From Δ CDE:

$$m (\angle DCE) = 180 - (90 + 50) = 40^{\circ}$$

- ∴ CE bisects ∠ ACD.
- \therefore m (\angle ACE) = m (\angle DCE) = 40°

- 2 :: E ∈ CB
 - \therefore \angle ABE is an exterior angle of \triangle ABC.
 - ∴ m (∠ ABE) > m (∠ A)
 - : In $\triangle \triangle$ ABM and CDM:

$$\begin{cases} AM = CM \\ BM = DM \\ m (\angle AMB) = m (\angle CMD) (V.O.A) \end{cases}$$

- \therefore \triangle ABM \equiv \triangle CDM, then we deduce that:
 - $m (\angle A) = m (\angle ACD)$ From 1 and 2:

 \therefore m (\angle ABE) > m (\angle ACD)



FIRST ALGERBA

Q1: Choose the correct answer:

1) The multiplicative inverse of the number	$\frac{\sqrt{3}}{6}$	is
---	----------------------	----

(a) √3

(b) $6\sqrt{3}$ (c) $2\sqrt{3}$

(d) $-2\sqrt{3}$

(a)]-∞, 2[(b)]-2, ∞[(c)]-∞, -2[(d)]2, ∞[

3) $\sqrt[3]{-64} + \sqrt{16} = \dots$

(a) zero

(b) 8

(c) -8

(d) ±8

4) A right circular cylinder whose radius length is 7 cm. and its height is 5 cm. then its lateral area is cm²

(a) 50 π

(b) 70π

 $(c) 9 \pi$

(d) 35 π

5) If the volume of a cube is 64 cm³: then its edge length is cm.

(c) 16

(d) 64

6) The S.S. of the equation: $2 \times + 6 = 0$ is when $\times \in \mathbb{Z}$

(a)-6

(b) -3

(c) {-3}

(d) zero

7) If the circumference of a circle is 8 π cm., then its radius length is cm

@ 2MATHEBIATICS TO A CHER @ 8

8) The multiplicative inverse of the number ($\sqrt{3}$ - $\sqrt{2}$) is

(a) 1

 $(b)\sqrt{3} + \sqrt{2}$ $(c)\sqrt{2} - \sqrt{3}$

 $\frac{1}{\sqrt{3}+\sqrt{2}}$

9) If -2x < 6, then x

(a) < 6

(b) > -3

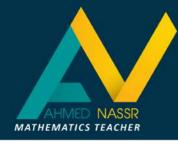
(c) > 6

(d) > -6









FIRST ALGERBA

10) The solution set	of the inequality:	· 2 < 3 x + 7 ≤ 10 in F	? is
<pre>(a) [-3 , 1[</pre>	b]-3 , 1[©]1 , 3]	d]-3 , 1]
11) $\sqrt[3]{2} + \sqrt[3]{2} = \dots$			
	b ³ √ 4	© ³ √8	<mark>d</mark> ³ √16
12) The volume of a	cube is L cm³ , If the	e edge length becan	ne twice the first
,then the ratio be	etween the <mark>volu</mark> me	of first to second is	·
a 1 : 4	b 8:1	C 4:1	d 1:8
13) The volume of th	e sphere w <mark>hose dia</mark>	meter length is 6 c	m, <mark>equals </mark> cm³
a 288	b 12 π	© 36 π	d 288 π
14) If three quarters	of the volume o <mark>f a</mark>	<mark>sphere</mark> equals 8 π c	<mark>m³ , th</mark> en the
length of its radio	us equals cm		
a 64	b 8	© 4	d 2
15) The number 3 be	longs to the S.S, of	the inequality	
(a) x > 3	b x < 3	© -x ≥ -3	(d) $-x > 3$
16) If $x = \sqrt{2} + 10$, $y =$	$\sqrt{2}$ - 10, then (x + y	/) ² =	
(a) 6	b 8	C 4	d 4√2
17) If the surface are	a of a sphere is 9 π	cm ² , then its diam	eter length =cm.
	0630 0 3 7		d 6









FIRST ALGERBA

Q2: Complete the following:

- 1) The volume of the sphere whose radius length is 14 cm, $\pi = \frac{22}{7}$ is
- 2) If $\sqrt{x} = \sqrt{2} + 1$, then $x^2 = \dots$
- 3) The additive inverse of the number $\sqrt[3]{-8}$ is
- 5) The sum of lengths of all edges of a cube is 48 cm. then its volume is
- 6) The multiplicative inverse of the number ($\sqrt{7} + \sqrt{6}$) in the simplest form is
- 7) If $x^2 = (2\sqrt{3} \sqrt{7})(2\sqrt{3} + \sqrt{7})$, then x =
- 8) If $x^2 y^2 = 16, \sqrt{x} \sqrt{y} = \sqrt{2}$, then $x + y = \dots$
- 9) If $\frac{x}{5-\sqrt{5}} = 5+\sqrt{5}$, then the value of x is the simplest form is
- 11) If -2 x < 37 then x vi-A-T-ICS TEACHER
- 12) The S.S of the enquality: 2 x < 0 in R is
- 13) A right circular cylinder with volume π r³ cm³, then its height =
- 14) The volume of a cube is 1 cm³, then the sum of

its edge lengths = cm.









FIRST ALGERBA

Q3: Answer the following:

- 1) Find the solution set of the following inequality in R, then represent it on the number line: $3x + 7 \le 10$
- 2) If $x = \frac{4}{\sqrt{7} \sqrt{3}}$ and $y = \sqrt{7} \sqrt{3}$, Prove that: x and y are conjugate numbers, then find the value of : $(x + y)^2$ in its simplest form.
- 3) simplify to the simplest form: $\sqrt{18} + \sqrt[3]{54} 3\sqrt{2} \frac{1}{2}\sqrt[3]{16}$
- 4) Find in R the S.S. and represent it on the number line: $5 \le 2x + 1 \le 9$
- 5) A right circular cylinder, the length of its base rudius is 7 cm, its heighr is 10 cm. Find its volume.
- 6) A metallic sphere, with diameter length 6 cm. has got melt and changed into a right circular cylinder with base radius length 3 cm. Find its height.
- 7) Find the height of a right circular cylinder whose height is equal to its base radius length and its volume is 72 π cm³
- 8) The sum of lengths of all edges of a cube is 60 cm. Find:

a. Its volume

b. Its total area











SECOND GEOMETRY

Q1: Choose t	he correct a	nswer:	
1) In Δ ABC, if AB	< AC, then m (\angle B) m (∠C)	
a <	b =	© >	d ≤
2) An isosceles tri	angle, the measu	re of one of its an	gles is 60°,
then the numb	er of its axis <mark>o</mark> f sy	mmetry is	
a 0	b 1	© 2	d 3
3) If Δ ABC has 1 a	ixis of sy <mark>mmetry,</mark>	m (∠ABC) = 120°	, m (<mark>∠A) =</mark>
a 30°	b 60°	© 90°	d 120°
4) If the measure	of one angle in t	<mark>he ri</mark> ght-angled tr	i <mark>angle is 4</mark> 5°,
then the numb	er of axes of sy <mark>mi</mark>	<mark>metry</mark> of the tria <mark>n</mark>	<mark>gle is</mark>
a 0	b 1	© 2	d 3
5) If X lies on the	axis of symmetry	of AB, then XA	хв
a <	b =	c >	d ≤
6) In Δ ABC, if m (.	\angle C) = 100°, then i	its lo <mark>ngest side i</mark> s	
(a) AB	(b) CB	© AC	d otherwise
7) If a triangle has	two angles meas	suring 45° and 65°	, then the
number of axes	of symmetry of t	the triangle is	
a 0_	(b) 1	© 2	d 3
8) In Δ ABC, if AB_	\bot BC and AB = BC	, then m (\angle A) = $$	
a 30°	b 45°	© 60°	d 90°
9) If Δ ABC has the	ree axes of synme	etry and AD is a m	edian,
Then AC =	BD.		

a 2

 $\bigcirc \frac{1}{2}$

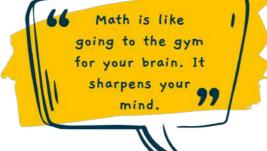






SECOND GEOMETRY

10) If A∈ L, where	L is axis of symm	etry of \overline{BC} , then A	ΔB AC
(a) =	b >	© ≡	d <
11) If ABCD is a qua	drilateral in whic	h AB = AD and BO	C = DC ,
then AC is	BD		
Parallel to	b equal to	© congruent to	daxis of symmetry
12) In the rhombus	ABCD. the axis of	f symmetry of $\overline{\sf AC}$	is
(a) BD	b AB	© AD	d CD
13) The triangle wh	ose sides <mark>lengths</mark>	are 2 cm. , (X + 3) <mark>cm. an</mark> d 5 cm.
becomes an isos	celes triang <mark>le wh</mark>	nen X = cm	
a 1	b 2	© 3	d 4
14) In Δ DEF , if DE :	> EF , then m (∠F) >	
○ ∠ E	b ∠ D	© ∠ F	d otherwise
15) Isoscelse trapez	ium has	axis <mark>of symmet</mark> ry.	
a 1	b 2	© 3	d 0
16) In Δ ABC, AB = 3	cm., BC = 5 cm,	AC = 4 cm, then t	he ascending
order of the me	asues of the angle	s of Δ ABC is	
\bigcirc \angle C, \angle B, \angle A	10037	© ∠C, ∠A, ∠B	
\bigcirc $\angle A, \angle B, \angle C$		\bigcirc \angle B, \angle A, \angle C	
66	Math is like going to the gym for your brain. It		











SECOND GEOMETRY

Q2: Complete the following:

1) The number of symmetry axes of the equilateral triangle is
2) The longest side in the right-angled triangle is
3) In the right-angled triangle, the hypotenuse is the side.
4) has 4 axes of symmetry.
5) The bisector of the vertex angle of an isosceles triangle bisects
the base and
6) In Δ ABC, if AB > BC , then m(∠) > m (∠)
7) If \triangle ABC, has three axes of symmetry and AD is a median,
Then AC = BD
8) The straight line perpendicular to a line segment from its
midpoint is called
9) The bisector of the vertex of an isosceles triangle and
10) In any triangle, if the lengths of two sides are not equal,
then the greater side in length is opposite to
11) If x < y and b < a, then y + a >T.E.A. C H E R
12) In \triangle ABC. If $m(\angle A) = 67^{\circ}$ and $m(\angle B) = 33^{\circ}$, then $AB > >$











SECOND GEOMETRY

Q3: Answer the following:

1) In the opposite figure:

ABC is a triangle in which:

AB = AC,
$$\overline{AD} \perp \overline{BC}$$
, m($\angle BAC$) = 100°

and BD = 3 cm.

Find: a. $m(\angle BAD)$

b. The length of CB

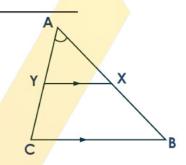




ABC is a triangle, AB > AC.

and XY // BC, Prove that:

 $m(\angle AYX) > m(\angle AXY)$



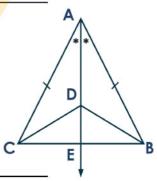
3) In the opposite figure:

ABC is a triangle in which AB = AC,

 \overrightarrow{AE} bisects $\angle BAC$, $\overrightarrow{AE} \cap \overrightarrow{BC} = \{E\}$ and $D \in \overrightarrow{AE}$

Prove that: a. BE = $\frac{1}{2}$ BC

b. BD = CD

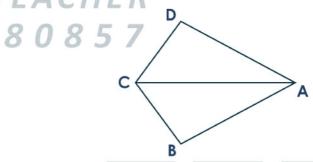


4) In the opposite figure:

AD > DC, and AB > BC

Prove that:

 $m(\angle BCD) > m(\angle BAD)$











FIRST ALGERBA

ANSWER MODEL

Q1: Choose the correct answer:

1) c

6) c

11) c

16) b

2) b

7) b

12) d

17) b

3) a

8) b

13) c

4) b

5) a

9) b

14) d

10) d

15) c

Q2: Complete the following:

6)
$$\sqrt{7} - \sqrt{6}$$

11) >
$$\frac{-3}{2}$$

2)
$$3 + 2\sqrt{2}$$

8)
$$8\sqrt{2}$$

5) 64

AHMED NASSR

MATHEMATICS TEACHER T E L : 0 1 0 0 3 7 8 0 8 5 7













SECOND GEOMETRY

ANSWER MODEL

Q1: Choose the correct answer:

1) c

6) a

11) d

16) a

2) d

7) a

12) a

3) a

8) b

13) b

4) b

9) a

14) b

5) b

10) a

15) a

Q2: Complete the following:

1) 3

7) 2 or twice

2) hypotenuse

8) axis of symmetry

3) longest

9) bisect base, perpendicular to it

4) square

10) greater angle

5) perpendicular to it

11) x + a

6) C, A

12) BC , AC

MATHEMATICS TEACHER T E L : 0 1 0 0 3 7 8 0 8 5 7









Mathematics November Exam (2023 - 2024)

1	A	Choose	the	correct	answer	from	those	given :	
	_				seven e.w	** ~ ***	*****	Per	

(1) $\sqrt[3]{-64} + \sqrt{16} = \dots$

(a) zero (b) 8 (c) -8 (d) ± 8 The volume of the cuboid whose dimensions are $\sqrt{3}$, $\sqrt{2}$ and $\sqrt{6}$ cm is

(a) 6

(b) 36

(c) 6\square

(3) The S.S. of the inequality: $-1 \le X < 1$ in \mathbb{R} is

(a)]-1,1]

(b) [-1,1[

(c)]-1,1[

(d)[-1,1]

2 Complete the following:

(1) The conjugate number of the number $\frac{2}{\sqrt{5}-\sqrt{3}}$ is

(2) If the edge length of a cube is 6 cm, then its volume = cm³

(3) The additive inverse of the number $\sqrt[3]{-8}$ is

3 Answer the following:

(a) If $x = x = \sqrt{5} - 2$ and $y = \sqrt{5} + 2$, Find the value of the following:

[1] x + y[2] x y

(b) Find: $\sqrt[3]{54} + \sqrt[3]{16} - \sqrt[3]{250}$

(c) Find in \mathbb{R} the solution set of the inequality: 4x + 3 > 5x + 2 > 4x

Mathematics November Exam (2023 – 2024)

1	A	Choose	the	correct	answer	from	those given :	:
---	---	--------	-----	---------	--------	------	---------------	---

- (1) In \triangle ABC, if m (\angle C) = 100°, then its longest side is
 - (a) AB
- (b) CB
- (c) AC

- (d) otherwise
- (2) If $C \in axis of symmetry of \overline{AB}$, then $AC BC = \dots$
 - (a) zero
- (b) 1

(c) 2

- (d) 4
- (3) In \triangle ABC has one axis of symmetry and m (\angle ABC) = 120°, then m (\angle A) = (a) 90° (b) 120° (c) 60° (d) 30°

2 Complete the following:

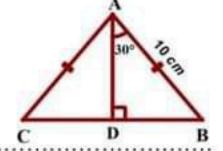
- (1) In \triangle ABC, AB = 10 cm , BC = 4 cm , AC = 7 cm , then the smallest angle in measure is
- (2) In \triangle ABC, if m (\angle A) = m (\angle B) = 60°, then the number of axes of symmetry of \triangle ABC is
- (3) The median of the isosceles triangle drawn from the vertex angle is

3 Answer the following:

(a) In the opposite figure:

AB = AC, $\overline{AD} \perp \overline{BC}$, AB = 10 cm, $m (\angle BAD) = 30^{\circ}$

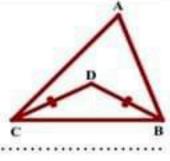
Find: [1] The length of \overline{BC} [2] The area of \triangle ABC



(b) in the opposite figure:

If $m (\angle ABC) > m (\angle ACB)$ and BD = DC

Prove that : $m (\angle ABD) > m (\angle ACD)$



Mathematics November Exam (2023 – 2024)

1 Choose the correct answer from those given :

(1)
$$\sqrt[3]{-64} + \sqrt{16} = \dots$$

$$(c) - 8$$

$$(d) \pm 8$$

(a) zero (b) 8 (c)
$$-8$$
 (d) ± 8 (2) The volume of the cuboid whose dimensions are $\sqrt{3}$, $\sqrt{2}$ and $\sqrt{6}$ cm is

(c)
$$6\sqrt{6}$$

(d)
$$18\sqrt{2}$$

(b)
$$[-1,1[$$
 (c) $]-1,1[$

$$(c)]-1,1$$

$$(d)[-1,1]$$

2 Complete the following:

3 Answer the following:

(a) If
$$x = x = \sqrt{5} - 2$$
 and $y = \sqrt{5} + 2$, Find the value of the following:

[1]
$$x + y$$
 [2] $x y$

Solution:

[1]
$$x + y = (\sqrt{5} - 2) + (\sqrt{5} + 2) = 2\sqrt{5}$$

[2]
$$xy = (\sqrt{5} - 2)(\sqrt{5} + 2) = 5 - 4 = 1$$

(b) Find:
$$\sqrt[3]{54} + \sqrt[3]{16} - \sqrt[3]{250}$$

Solution:

$$\sqrt[3]{54} + \sqrt[3]{16} - \sqrt[3]{250} = \sqrt[3]{2 \times 27} + \sqrt[3]{2 \times 8} - \sqrt[3]{2 \times 125}$$

= $3\sqrt[3]{2} + 2\sqrt[3]{2} - 5\sqrt[3]{2} = zero$

(c) Find in \mathbb{R} the solution set of the inequality : 4x + 3 > 5x + 2 > 4x

Solution:

$$4x + 3 - 4x > 5x + 2 - 4x > 4x - 4x$$

$$\therefore 3 > x + 2 > 0$$

$$\therefore 1 > x > -2$$

∴ The S.S. =
$$]-2,1[$$



Mathematics November Exam (2023 – 2024)

1 Choose the correct answer from those given :

- (1) In \triangle ABC, if m (\angle C) = 100°, then its longest side is
 - (a) AB
- (b) CB
- (c) AC

- (d) otherwise
- (2) If C ∈ axis of symmetry of AB, then AC BC =
 - (a) zero
- (b) 1

(c) 2

- (d) 4
- (3) In \triangle ABC has one axis of symmetry and m (\angle ABC) = 120°, then m (\angle A) = (a) 90° (b) 120° (c) 60° (d) 30°
- 2 Complete the following :

- (3) The median of the isosceles triangle drawn from the vertex angle is

 Perpendicular to the base and bisects it

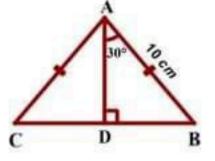
3 Answer the following:

(a) In the opposite figure:

AB = AC, $\overline{AD} \perp \overline{BC}$, AB = 10 cm, $m (\angle BAD) = 30^{\circ}$

Find: [1] The length of BC

[2] The area of △ ABC



Solution:

[1] :
$$m (\angle BAD) = 30^{\circ}$$
, $m (\angle ADB) = 90^{\circ}$

$$\therefore BD = \frac{1}{2} AB = \frac{1}{2} \times 10 = 5 cm$$

$$\therefore$$
 AB = AC and $\overrightarrow{AD} \perp \overrightarrow{BC}$

- : D is the midpoint of BC
- \therefore BC = 5 + 5 = 10 cm

[2] : The area of triangle = $\frac{1}{2}$ × base × h

In △ ADB is right-angled at D:

$$\therefore AD = \sqrt{(10)^2 - (5)^2} = \sqrt{75} = 5 \sqrt{3} \text{ cm}$$

∴ The area of \triangle ABC= $\frac{1}{2}$ × 10 × 5 $\sqrt{3}$ = 25 $\sqrt{3}$ cm²

(b) in the opposite figure:

If $m (\angle ABC) > m (\angle ACB)$ and BD = DC

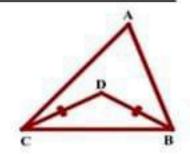
Prove that : $m (\angle ABD) > m (\angle ACD)$



- $"BD = DC "m (\angle DBC) = m (\angle DCB) \longrightarrow (1)$
- $: m (\angle ABC) > m (\angle ACB) \longrightarrow (2)$ given

Subtracting (1) from (2): $\dot{m} (\angle ABC) - m (\angle DBC) > m (\angle ACB) - m (\angle DCB)$

 \therefore m (\angle ABD) > m (\angle ACD)



1 Complete the following:

If: $X \in \mathbb{Z}$ and $X < \sqrt{5} < X + 1$ then $X = \dots$

2 The S.S. in \mathbb{R} of the inequality: 2 - x < 2 is

13 The S.S. in \mathbb{R} of the equation : $\sqrt{2} x^2 = 5\sqrt{2}$ is

2 Choose the correct answer from those given :

 $\sqrt[3]{16} - \sqrt[3]{2} = \dots$

(a) $\sqrt[3]{14}$ (b) $\sqrt[3]{2}$

(c)2

(a) $\{2\}$ (b) [1,3]

(c) [1,3[

3 If:
$$x = \frac{1}{\sqrt{2} - 1}$$
 and y is the conjugate number of x, then $y = \dots$

(a) $\sqrt{2} - 1$ (b) $\sqrt{2} + 1$

 $(d) - 1 - \sqrt{2}$

f 3 Find in $\Bbb R$ the S.S. of each of the following and represent it on the number line :

 $\bigcirc 2 < 2 - 3 \ X \le 8$

 $2\sqrt{3}x - 2 = 1$

4 [a] Simplify to the simplest form:
$$\frac{1}{3}\sqrt{18} + 2\sqrt{\frac{1}{2}} - \sqrt{8}$$

[b] Find in the simplest form : $\sqrt[3]{-16} + \frac{14}{\sqrt{7}} - \sqrt{28} + \sqrt[3]{54}$

If
$$: X =]-3, 2]$$
, Find in the form of an interval using the number line :

 $\mathbb{R}_{\downarrow} \cap X$

2 X - R_

Choose the correct answer from those given :

(a) N

(b) Z

(c) Q

(d) Q

(a)
$$\frac{1}{2}\sqrt{5} + \sqrt{5} - 2\sqrt{5} = \dots$$

(a)√5

(b) zero

(c) $5\sqrt{5}$

(3) The cubic root of 0.008 is

(a) 0.02

(b) 0.002

(c) $\frac{1}{5}$

(4)
$$]-1,7[\cap [-1,7] = \cdots$$

(a) $\{-1,7\}$ (b) [-1,7]

(c)]-1,7[

(d) Ø

$$(5)\sqrt{(-5)^2} + \sqrt[3]{(-5)^3} = \cdots$$

(a) - 10

(b) 10

(c) zero

 $(d) \pm 10$

2 Complete the following:

(1) The conjugate of $\frac{2}{\sqrt{5}-\sqrt{3}}$ is

(2) The S.S. of the equation : $x^3 + 64 = 0$ in \mathbb{R} is

(3) If: $x = \sqrt{3} - 2$, $y = \sqrt{3} + 2$, then $xy = \dots$

$$(4)^{3}\sqrt{8+8} = 2 \times \dots$$

(5)]4 ,7[U {5 ,6 ,7} = ·········

[3] [a] Represent the number $-\sqrt{5}$ on the number line.

[b] If: $x = \sqrt{3} + \sqrt{5}$, $y = \sqrt{5} - \sqrt{3}$ Find:

(2)
$$X^2 + y^2$$

[4] [a] Find in the simplest form: $\sqrt{48} - 2\sqrt{12} + 3\sqrt{\frac{1}{3}}$

[b] A square, its area 196 cm.², find the length of its diagonal.

Find in the form of an interval , each of the following using the number line :

(1)
$$]-5, \infty[-[2, \infty[$$

(2)
$$]-2,4] \cup [2,7[$$

1 Choose the correct answer from those given :

- (1) The length of the opposite side to the angle of measure 30° in the right-angled triangle = length of the hypotenuse.
 - (a) square
- (b) $\frac{1}{2}$
- (c) $\frac{2}{3}$
- (d) twice
- (2) XYZ is a triangle in which XY = XZ, then the exeterior angle of this triangle at the vertex y is angle.
 - (a) an acute
- (b) a right
- (c) an obtuse
- (d) an reflexed
- (1) Number of symmetric lines of equilateral triangle is
 - (a) zero

(b) 1

(c) 2

- (d) 3
- (4) If \overline{AD} is a median in $\triangle ABC$, M is the intersection point of the medians
 - , AD = 6 cm. , then AM =
 - (a) 2 cm.
- (b) 4 cm.
- (c) 6 cm.
- (d) 9 cm.

(5) In the opposite figure:

ABC is a triangle in which:

$$AB = AC \cdot m (\angle B) = 65^{\circ} \cdot$$

$$D \in \overrightarrow{BC}$$
, then m ($\angle ACD$) =

(a) 65°

(b) 130°

(c) 115°

(d) 50°

2 Complete each of the following:

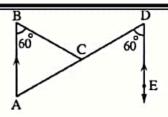
- (1) The straight line which is perpendicular to a line segment at its middle is called
- (2) \triangle ABC in which: AB = AC, m (\angle A) = 60°, then the type of \triangle ABC according to its side lengths is
- (3) In the right-angled triangle, the length of the median from the vertex of the right angle equals
- (4) The bisector of the vertex angle of an isosceles triangle and
- (5) If ABCD is a square, then the axis of symmetry of \overline{AC} is

[3] [a] In the opposite figure:

$$\overrightarrow{DE} / / \overrightarrow{BA}, C \in \overrightarrow{AD},$$

$$m (\angle D) = m (\angle B) = 60^{\circ}$$

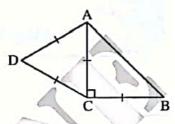
Prove that: ABC is equilateral



[b] In the opposite figure:

$$m (\angle ACB) = 90^{\circ} , AD = DC = CB = AC$$

Find by proof: m (∠ BAD)



4 In the opposite figure:

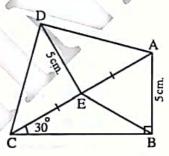
$$m (\angle ABC) = 90^{\circ}, m (\angle ACB) = 30^{\circ}$$

, E is the midpoint of \overline{AC} ,

$$AB = DE = 5 \text{ cm}$$
.

Find the length of each of : \overline{AC} and \overline{BE}

Prove that : $m (\angle ADC) = 90^{\circ}$

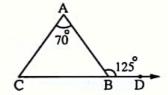


[b] In the opposite figure:

$$D \in \overline{CB}$$
, $m (\angle ABD) = 125^{\circ}$

$$m (\angle A) = 70^{\circ}$$

Prove that: ABC is isosceles.



1 Complete the following:

- In a triangle, if two sides have unequal lengths, the longer is opposite the angle
- The bisector of the vertex angle of an isosceles triangle bisects the base and
- In \triangle ABC: If m (\angle A) = 80° and m (\angle B) = 60°, then the shortest side in the triangle is

2 Choose the correct answer from those given:

- If \overline{AD} is a median in $\triangle ABC$, M is the point of intersection of its medians, then $AM = \cdots AD$
 - (a) $\frac{1}{2}$

(b) 2

- (c) $\frac{1}{3}$
- (d) $\frac{2}{3}$
- ② In \triangle ABC: If m (\angle B) = 90°, then AC AB
 - (a) <

- (b) ≤
- (c) >

- (d) =
- ⑤ In \triangle ABC : If m (\angle A) = 100° and m (\angle B) > m (\angle C), then
 - (a) AB > AC
- (b) AC > BC
- (c) AB > BC
- (d) BC > AC

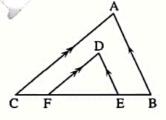
3 In the opposite figure:

ABC is a triangle, E and F are two points on BC such that:

ED // BA and FD // CA If AB < AC,



DE < DF



[a] In the opposite figure:

$$\overline{AD} // \overline{BC}$$
, $AB = AD$

Find the value of: X and y

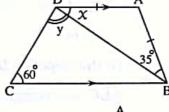


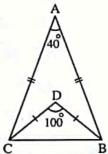
 \triangle ABC in which: AB = AC, DB = DC,

$$m(\angle A) = 40^{\circ}$$

$$m (\angle D) = 100^{\circ}$$

Find: m (∠ ABD)





Complete the following:

- 2 The S.S. in IR of the inequality: 2 x < 2 is $\sqrt{2 + 2}$
- 13 The S.S. in \mathbb{R} of the equation : $\sqrt{2} x^2 = 5\sqrt{2}$ is $\sqrt{5} \sqrt{5}$

Choose the correct answer from those given:

$$\mathbf{O}^3 \sqrt{16} - \mathbf{10}^3 = \cdots$$

$$(a)^{3}\sqrt{14}$$

$$(b)\sqrt[3]{2}$$

(c) 2

(d)
$$7\sqrt[3]{2}$$

(a)
$$\{2\}$$
 (b) $[1,3]$

(3) If:
$$x = \frac{1}{\sqrt{2} - 1}$$
 and y is the conjugate number of x, then y =

$$(a)\sqrt{2}-1$$

(b)
$$\sqrt{2} + 1$$
 (c) $\sqrt{2}$

$$(d) - 1 - \sqrt{2}$$

Find in $\mathbb R$ the S.S. of each of the following and represent it on the number line :

$$2 < 2 - 3 \times 8$$

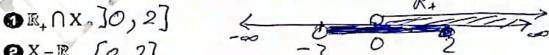
$$02<2-3x\leq 8$$
 $[-2,0[$

$$2\sqrt{3}x-2=1$$
 $\sqrt{3}$

[4] [a] Simplify to the simplest form:
$$\frac{1}{3}\sqrt{18} + 2\sqrt{\frac{1}{2}} - \sqrt{8} = Zero$$

[b] Find in the simplest form:
$$\sqrt[3]{-16} + \frac{14}{\sqrt{7}} - \sqrt{28} + \sqrt[3]{54} = \sqrt[3]{2}$$

[5] If: X =]-3, 2], Find in the form of an interval using the number line:



1 Choose the correct answer from those given :

(a) N

(c) Q

(2)
$$\frac{1}{2}\sqrt{5} + \sqrt{5} - 2\sqrt{5} = \dots$$

(a) 1/5

(b) zero

(c) 5 \ 5

(3) The cubic root of 0.008 is

(a) 0.02

(b) 0.002

(d) 0.4

$$(4)$$
]-1,7[\cap [-1,7]=......

(a) $\{-1,7\}$ (b) [-1,7]

((c)]-1,7[).

(d) Ø

$$(5)\sqrt{(-5)^2} + \sqrt[3]{(-5)^3} = \dots$$

(a) - 10

(b) 10

(c) zero

 $(d) \pm 10$

2 Complete the following:

(1) The conjugate of $\frac{2}{\sqrt{5}-\sqrt{3}}$ is $-\sqrt{5}$. $-\sqrt{3}$ (2) The S.S. of the equation : $x^3 + 64 = 0$ in \mathbb{R} is -4

(3) If: $x = \sqrt{3} - 2$, $y = \sqrt{3} + 2$, then xy = ---1.

 $(4)\sqrt[3]{8+8} = 2 \times \sqrt[3]{-2}$

(5)]4,7[U{5,6,7}=.].4,7]

[3] [a] Represent the number $-\sqrt{5}$ on the number line.

[b] If: $x = \sqrt{3} + \sqrt{5}$, $y = \sqrt{5} - \sqrt{3}$ Find:

$$(1) X y = 2$$

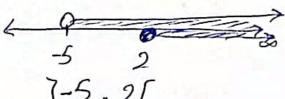
$$(2) x^2 + y^2 = 16$$

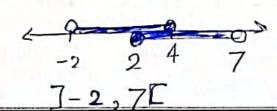
(1) xy = 2 (2) $x^2 + y^2 = 16$ [4] [a] Find in the simplest form: $\sqrt{48} - 2\sqrt{12} + 3\sqrt{\frac{1}{3}} = \sqrt{3}$

[b] A square, its area 196 cm. 2 , find the length of its diagonal. = $14\sqrt{2}$

[5] Find in the form of an interval , each of the following using the number line :

$$(1)$$
]-5, ∞ [-[2, ∞ [





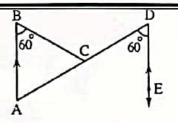
Choose the correct at	nswer from those give	n:	
767		le of measure 30° in the	right-angled
triangle = ········ le	ength of the hypotenuse		
(a) square	(b) $\frac{1}{2}$)	(c) $\frac{2}{3}$	(d) twice
(2) XYZ is a triangle i	in which $XY = XZ$, the	en the exeterior angle of	this triangle at the
vertex y is a	ngle.		4
(a) an acute	(b) a right	(c) an obtuse	(d) an reflexed
(1) Number of symme	etric lines of equilateral	triangle is	
(a) zero	(b) 1 .	(c) 2	(d) 3
(4) If AD is a median	in \triangle ABC, M is the ir	ntersection point of the n	nedians
, AD = 6 cm., the	n AM =	1000	7
(a) 2 cm.	(b) 4 cm.	(c) 6 cm.	(d) 9 cm.
(5) In the opposite fi	gure:	1	A
ABC is a triangle	in which :		*
ABC is a triangle AB = AC \cdot m (\angle			65%
	B) = 65°,		D C B
$AB = AC$, m (\angle 1	B) = 65°,	(b) 130°	+
$AB = AC$, $m (\angle BC)$ $D \subseteq \overrightarrow{BC}$, then m	B) = 65°,		D C B
AB = AC, m (\angle 1) D \in BC, then m (a) 65°	B) = 65° , (∠ ACD) =	(b) 130°	D C B
AB = AC, m (\angle) D \in BC, then m (a) 65° (c) 115° Complete each of the	B) = 65° , (∠ ACD) = ne following :	(b) 130°	D C B
AB = AC, m (\angle 1) D \in BC, then m (a) 65° (c) 115° Complete each of th (1) The straight line w (2) \triangle ABC in which:	B) = 65°, $(\angle ACD) = \cdots$ The following: which is perpendicular to $AB = AC$, $m(\angle A) = 0$	(b) 130° (d) 50°	AXIS
AB = AC, m (∠) D∈ BC, then m (a) 65° (c) 115° Complete each of the	B) = 65°, $(\angle ACD) = \dots$ The following: which is perpendicular to the second	(b) 130° (d) 50° a line segment at its mice of δ0°, then the type of δ	A Xis ddle is called Significant ABC according to
AB = AC, m (∠) D∈ BC, then m (a) 65° (c) 115° Complete each of th (1) The straight line w (2) △ ABC in which: its side lengths is (3) In the right-angle angle equals free;	B) = 65°, (\(\alpha\) ACD) = The following: which is perpendicular to the length of the le	(b) 130° (d) 50° a line segment at its mice of δ0°, then the type of δ	AXIS idle is called STANA ABC according to ertex of the right
AB = AC, m (∠) D∈ BC, then m (a) 65° (c) 115° Complete each of the	B) = 65°, (\(\alpha\) ACD) = The following: which is perpendicular to the length of the length of evertex angle of an ison	(b) 130° (d) 50° a line segment at its mice of Δ of the median from the very hypotenuse	AXIS idle is called STANA ABC according to ertex of the right

[3] [a] In the opposite figure:

$$\overrightarrow{DE} / / \overrightarrow{BA}, C \in \overrightarrow{AD},$$

$$m (\angle D) = m (\angle B) = 60^{\circ}$$

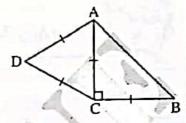
Prove that : ABC is equilateral



[b] In the opposite figure:

$$m (\angle ACB) = 90^{\circ}, AD = DC = CB = AC$$

Find by proof: $m(\angle BAD) = 105$



4 In the opposite figure :

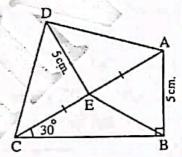
$$m (\angle ABC) = 90^{\circ}, m (\angle ACB) = 30^{\circ}$$

, E is the midpoint of AC,

$$AB = DE = 5 \text{ cm}$$
.

Find the length of each of : \overline{AC} and $\overline{BE} \rightarrow 5.$ Cm

Prove that: $m (\angle ADC) = 90^{\circ}$

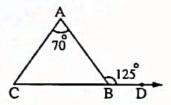


[b] In the opposite figure:

$$D \in \overrightarrow{CB}$$
, m ($\angle ABD$) = 125°

$$m (\angle A) = 70^{\circ}$$

Prove that : A ABC is isosceles.



1 Complete the following:

- In a triangle, if two sides have unequal lengths, the longer is opposite the angle . Freater in measure
- The bisector of the vertex angle of an isosceles triangle bisects the base and Per Pendicular
- In \triangle ABC: If m (\angle A) = 80° and m (\angle B) = 60°, then the shortest side in the triangle is \triangle B

2 Choose the correct answer from those given :

- If AD is a median in \triangle ABC, M is the point of intersection of its medians, then AM = AD
 - (a) $\frac{1}{2}$

- (b) 2

- ② In \triangle ABC: If m (\angle B) = 90°, then AC AB
 - (a) <

- (b) ≤
- (d) =
- **③** In \triangle ABC: If m (∠ A) = 100° and m (∠ B) > m (∠ C), then
 - (a) AB > AC
- (b) AC > BC
- (c) AB > BC
- (d) BC > AC

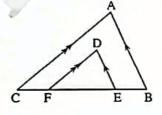
3 In the opposite figure:

ABC is a triangle, E and F are two points on BC such that:

ED // BA and FD // CA If AB < AC,

prove that:

DE < DF



[a] In the opposite figure :

$$\overline{AD} / \overline{BC}$$
, $AB = AD$ $\chi = 35$

$$\chi = 35$$

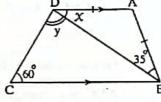
Find the value of : X and y

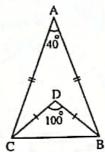
[b] In the opposite figure:

$$\triangle$$
 ABC in which: AB = AC, DB = DC,

$$m(\angle A) = 40^{\circ}$$

Find:
$$m(\angle ABD) = 30^{\circ}$$





Page (7) Final Revision-Algebra - 2 Prep-First Term

((Sheet 5))

" Operations on the real numbers "

Find each of the following in simplest form :

1)
$$\sqrt{2} + 3\sqrt{2} + 2\sqrt{2} = \dots$$

2)
$$5\sqrt{3} - 2\sqrt{3} + 4\sqrt{3} = \dots$$

3)
$$\sqrt{5} - \sqrt{3} + 2\sqrt{5} + \sqrt{3} = \dots$$

4)
$$3\sqrt{2} - 2\sqrt{5} + 5\sqrt{2} + \sqrt{5} = \dots$$

5)
$$\sqrt{3} \times \sqrt{3} = \dots$$

6)
$$\sqrt{2} \times \sqrt{3} = \dots$$

7)
$$2\sqrt{2} \times 3\sqrt{5} = \dots$$

8)
$$2\sqrt{2} \times 3\sqrt{2} = \dots$$

9)
$$\sqrt{2} (5 + \sqrt{2}) = \dots$$

10)
$$(\sqrt{2} + 1) (\sqrt{3} + 2) = \dots$$

4 Put the denominator as whole number :

1)
$$\frac{10}{\sqrt{5}}$$

2)
$$\frac{2}{3\sqrt{2}}$$

3)
$$\frac{\sqrt{2}+3}{\sqrt{2}}$$

Complete:

- 1) The additive inverse of $\frac{6}{\sqrt{2}} = \dots$
- 2) The additive inverse of $(\sqrt{2} \sqrt{5}) = \dots$
- 3) The multiplicative inverse of $\sqrt{5}$ is
- 4) The multiplicative inverse of $\frac{\sqrt{2}}{6}$ is

منترى توجيه (الرياضيات أر عاول إووار

Page (8) Final Revision-Algebra - 2 Prep-First Term

((Sheet 6))

" Operations on the square roots "

Find in simplest form :

1)
$$\sqrt{2} + \sqrt{18} + \sqrt{8}$$

2)
$$\sqrt{98} - \sqrt{128} - \sqrt{18} + 4\sqrt{2}$$

3)
$$2\sqrt{3} + \sqrt{27} - \sqrt{48}$$

4)
$$\sqrt{32} - \sqrt{72} + 6\sqrt{\frac{1}{2}}$$

5)
$$2\sqrt{5} + 4\sqrt{20} - 5\sqrt{\frac{1}{5}}$$

6)
$$\sqrt{3} + \frac{3}{\sqrt{3}} - \sqrt{2} \times \sqrt{6}$$

7)
$$\sqrt{27} + \sqrt{8} - 2\sqrt{12} + \sqrt{18}$$

8)
$$\sqrt{3} + 2\sqrt{20} + \sqrt{12} + \sqrt{45}$$

Complete:

1) If
$$X = \frac{\sqrt{6}}{\sqrt{2}}$$
 Then $X^{-1} = \dots$

2)
$$\sqrt{5}$$
, $\sqrt{20}$, $\sqrt{45}$, $\sqrt{80}$, in the same pattern

منترى توجيه (الرياضيات أرا عاول إووار

Page (9) Final Revision-Algebra - 2 Prep-First Term

((Sheet 7))

"The two conjugate numbers"

II Note 11

- 1) (X+3), (X-3) are conj
- 2) $(\sqrt{3} + \sqrt{2}), (\sqrt{3} \sqrt{2})$ are conj
- 3) $(\sqrt{5} 1), (\sqrt{5} + 1)$ are conj
- 4) $(\sqrt{5} + \sqrt{3}), (\sqrt{5} + \sqrt{3})$ not conj
- 1. If $X = \frac{2}{\sqrt{7} \sqrt{5}}$ $Y = \sqrt{7} \sqrt{5}$, Find $(X + Y)^2$
- 2. If $X = \sqrt{5} \sqrt{2}$ $Y = \frac{3}{\sqrt{5} \sqrt{2}}$ Prove that X and Y are conjugate numbers then Find $X^2 2XY + Y^2$
- 3. If $X = \sqrt{7} + \sqrt{5}$ $Y = \frac{2}{X}$ Find $\frac{X+Y}{XY}$
- 4. If $X = \frac{4}{\sqrt{7} \sqrt{3}}$ and $Y^{-1} = \frac{1}{\sqrt{7} \sqrt{3}}$ Find $X^2 Y^2$

Page (10) Final Revision-Algebra - 2 Prep-First Term

((Sheet 8))

" Operations on the cube roots "

Find in simplest form :

1)
$$\sqrt[3]{2} + \sqrt[3]{16} + 2 \sqrt[3]{54}$$

2)
$$\sqrt[3]{24} - 2\sqrt[3]{3} + \sqrt[3]{81}$$

3)
$$\sqrt[3]{-54} + \sqrt[3]{16} - \sqrt[3]{250}$$

4)
$$\sqrt[3]{81} + \sqrt[3]{-24} - 3 \sqrt[3]{\frac{1}{9}}$$

5)
$$\sqrt[3]{108} - 2\sqrt[3]{4} - \sqrt[3]{\frac{1}{2}}$$

6)
$$\sqrt[3]{3} - \sqrt[3]{4} \times \sqrt[3]{6} + 3\sqrt[3]{\frac{1}{9}}$$

7)
$$\frac{7}{3}\sqrt{18} + \sqrt[3]{54} - 7\sqrt{2} + \sqrt[3]{16}$$

8)
$$\sqrt[3]{-16} + \frac{14}{\sqrt{7}} - \sqrt{28} + \sqrt[3]{54}$$

منترى توجيه (الرياضيات أر ماول إووار

Page (11) Final Revision-Algebra - 2 Prep-First Term

((Sheet 9))

"Applications on the real numbers"

Important rules:

[[Cube]]

$$L.S.A = 4 L^2$$

$$T.S.A = 6 L^2$$

Volume =
$$L^3$$

[[Cuboid]]

$$L.S.A = 2(X + Y) \times Z$$

$$T.S.A = 2(XY + YZ + ZX)$$

$$Volume = XYZ$$

[[Circle]]

Circumference =
$$2 \Pi r$$

Area =
$$\Pi r^2$$

[[Sphere]]

Volume =
$$\frac{4}{3} \Pi r^3$$

Area =
$$4 \Pi r^2$$

[[Right circular cylinder]]

$$L.S.A = 2 \Pi rh$$

$$T.S.A = 2 \Pi rh + 2 \Pi r^2$$

Volume =
$$\Pi r^2 h$$

منترى توجيه (الرياضيات أرا عاول إووار

Page (12) Final Revision-Algebra - 2 Prep-First Term

Complete :

- 4) Aright circular cylinder with volume 40Π cm³ and its height 10 cm then its base radius =
- 5) The volume sphere whose diameter $6 \text{ cm} = \dots \text{cm}^3$.

4 Problems:

- 1) A cube whose lateral area is 36 cm². Find its total area and its volume.
- 2) A cube its volume 27 cm³. Find its total area.
- 3) The sum of all edges of a cube is 60 cm. Find its volume.
- 4) Acuboid its dimensions 3 cm, 4 cm, 5 cm. Find its total area and its volume.
- 5) A circle its area 154 cm². Find its circumference.
- 6) Aright circular cylinder its volume 924 cm³ and its height 6 cm. Find the lateral area.
- 7) Find the height of right circular cylinder whose height is equal to its base radius and its volume is $72 \, \Pi \, \text{cm}^3$.
- 8) The volume of sphere is 4188 cm^3 . Find its radius length.
- 9) Ametalic sphere with diameter 6 cm has got melt and changed into circular cylinder with radius 3 cm. Find its height.



Page (13) Final Revision-Algebra - 2 Prep-First Term

((Sheet 10))

"Solving equations and inequalities of first degree in one variable

in R "

♣ Find S.S of equations in R

1)
$$2 \times -3 = 4$$

2)
$$\sqrt{5} \times -1 = 4$$

Find S.S of inequalities in R and graph the S.S on number line:

1)
$$2 \times -1 \ge 3$$

2)
$$2 \times +5 \ge 3$$

3)
$$3-2 X \ge 7$$

4)
$$5 - 3 \ X \le 11$$

5)
$$-8 \le 3 \ X + 1 \le 4$$

6)
$$13 \ge 2 \times -1 \ge 5$$

7)
$$|-3| < 2 \times -1 < 5$$

8)
$$5 \le \frac{-2X+6}{3} < 4$$

9)
$$2+2 X \le 3 X +3 < 5+2 X$$

10)
$$X - 1 < 3 X - 1 \le X + 1$$

منترى توجيد (لرياضيات أر عاول إووار